



US011340862B2

(12) **United States Patent**
Garmark et al.

(10) **Patent No.:** **US 11,340,862 B2**
(45) **Date of Patent:** **May 24, 2022**

(54) **MEDIA CONTENT PLAYBACK DURING TRAVEL**

(71) Applicant: **Spotify AB**, Stockholm (SE)

(72) Inventors: **Sten Garmark**, Stockholm (SE);
Fredrik Schmidt, Stockholm (SE);
Johan Oskarsson, Stockholm (SE);
Caroline Arkenson, Stockholm (SE);
Shervin Shoravi, Stockholm (SE);
Adam Price, New York, NY (US);
Daniel Choe, Brooklyn, NY (US)

(73) Assignee: **Spotify AB**, Stockholm (SE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **16/665,867**

(22) Filed: **Oct. 28, 2019**

(65) **Prior Publication Data**

US 2020/0125320 A1 Apr. 23, 2020

Related U.S. Application Data

(63) Continuation of application No. 15/858,527, filed on Dec. 29, 2017, now Pat. No. 10,489,106.
(Continued)

(51) **Int. Cl.**

G06F 3/16 (2006.01)
G06F 3/04883 (2022.01)
G06F 3/04842 (2022.01)
H04N 21/422 (2011.01)
H04N 21/414 (2011.01)
H04N 21/482 (2011.01)
H04N 21/472 (2011.01)
H04N 21/2343 (2011.01)
H04N 21/45 (2011.01)

(Continued)

(52) **U.S. Cl.**

CPC **G06F 3/165** (2013.01); **G06F 3/04842** (2013.01); **G06F 3/04883** (2013.01); **G06F 3/167** (2013.01); **H04N 21/2343** (2013.01); **H04N 21/25891** (2013.01); **H04N 21/41407** (2013.01); **H04N 21/41422** (2013.01); **H04N 21/42203** (2013.01); **H04N 21/4394** (2013.01); **H04N 21/4524** (2013.01); **H04N 21/47217** (2013.01); **H04N 21/4825** (2013.01)

(58) **Field of Classification Search**

CPC combination set(s) only.
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,697,917 B2 4/2010 Camp, Jr. et al.
8,453,186 B2 5/2013 Roberts et al.

(Continued)

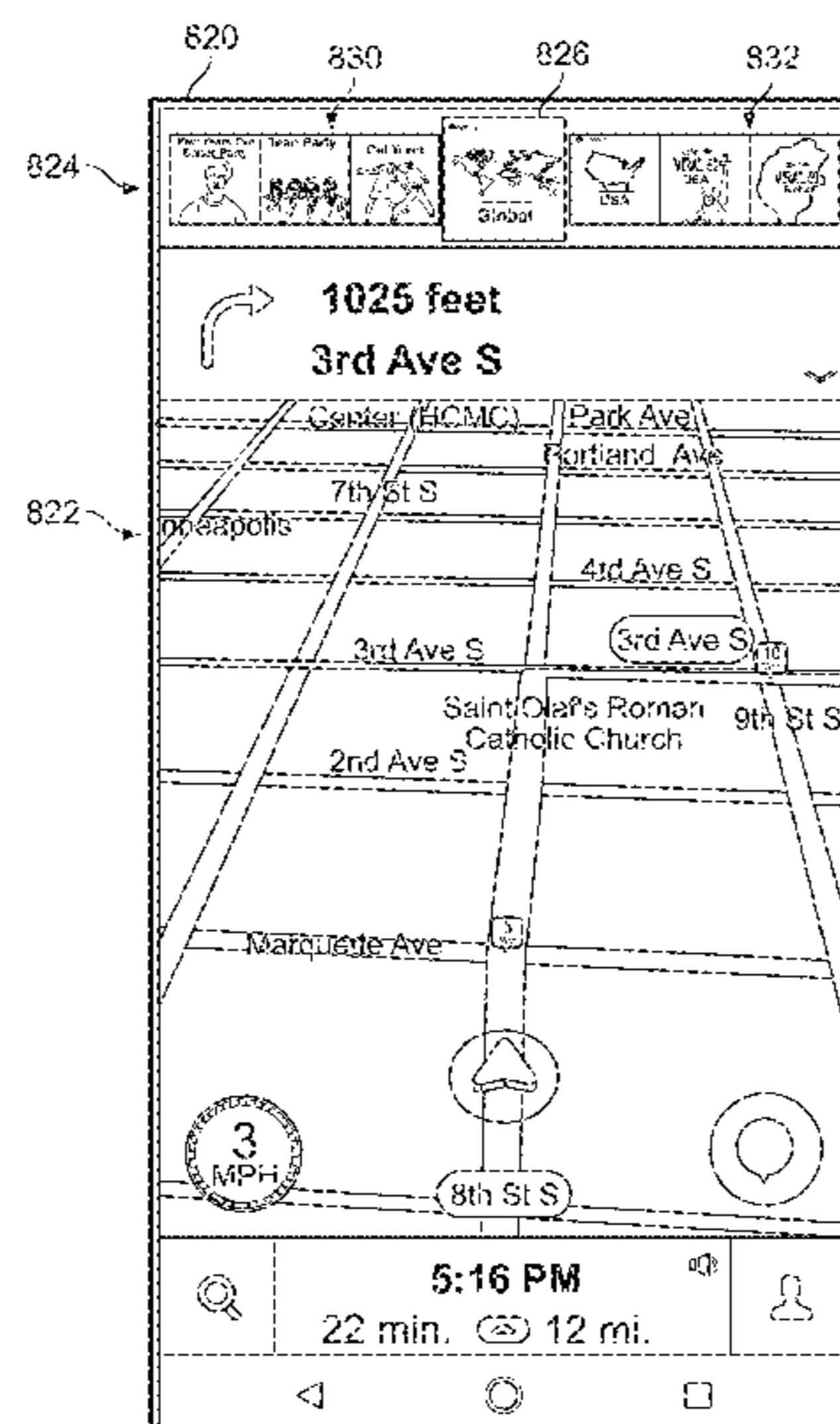
Primary Examiner — Hien L Duong

(74) *Attorney, Agent, or Firm* — Merchant & Gould P.C.

(57) **ABSTRACT**

Systems, devices, apparatuses, components, methods, and techniques for media content playback during travel are provided. An example method of generating a user interface for a media playback device. The method includes the step of displaying a first user interface screen in a first display format. The first display format including graphical representations of a plurality of selectable controls. The method also includes the step of determining that the media playback device is travelling and after determining that the media playback device is travelling, converting the first user interface screen to a second display format. The second display format includes fewer graphical representations of the plurality of selectable controls than the first display format.

20 Claims, 16 Drawing Sheets



Related U.S. Application Data						
(60)	Provisional application No. 62/441,299, filed on Dec. 31, 2016.	2012/0242581	A1	9/2012	Laubach	
		2012/0311444	A1	12/2012	Chaudhri	
		2012/0311500	A1	12/2012	Chaudhri	
		2012/0323938	A1*	12/2012	Skeen	H04L 65/4069 707/754
(51)	Int. Cl.	2013/0063362	A1	3/2013	Papakipos et al.	
	<i>H04N 21/439</i> (2011.01)	2013/0080968	A1	3/2013	Hanson	
	<i>H04N 21/258</i> (2011.01)	2013/0085586	A1	4/2013	Parekh	
		2013/0198677	A1	8/2013	Dash	
		2013/0205243	A1	8/2013	Rivera et al.	
(56)	References Cited	2013/0275924	A1*	10/2013	Weinberg	G01C 21/3664 715/863
	U.S. PATENT DOCUMENTS	2013/0317635	A1	11/2013	Bates et al.	
	8,525,012 B1 9/2013 Vang	2014/0035831	A1	2/2014	Fino	
	8,732,193 B2* 5/2014 Skeen	2014/0108929	A1	4/2014	Garmark	
		2014/0173457	A1	6/2014	Wang et al.	
	8,862,616 B2* 10/2014 Skeen	2014/0258553	A1*	9/2014	Skeen	G06F 16/639 709/231
	8,875,061 B1 10/2014 Lee	2015/0046812	A1	2/2015	Darby	
	9,207,092 B1* 12/2015 Yamasaki	2015/0177971	A1*	6/2015	Jeong	G06F 3/0488 715/716
	9,766,772 B2 9/2017 Hunt	2016/0062567	A1	3/2016	Yang	
	9,933,927 B2 4/2018 Yang et al.	2016/0103589	A1	4/2016	Dziuk	
	2002/0120925 A1 8/2002 Logan	2016/0132516	A1	5/2016	Greenberg	
	2003/0093790 A1 5/2003 Logan et al.	2016/0162125	A1	6/2016	Martella	
	2005/0154798 A1 7/2005 Nurmi	2016/0195989	A1*	7/2016	Czelnik	G06F 3/0416 345/174
	2006/0056806 A1 3/2006 Terakado et al.					
	2008/0030464 A1 2/2008 Sohm et al.	2016/0306532	A1	10/2016	Ko et al.	
	2008/0062141 A1 3/2008 Chandhri	2016/0321222	A1	11/2016	Greenberg et al.	
	2008/0066007 A1* 3/2008 Lau	2017/0010788	A1	1/2017	Srinivasaraghavan et al.	
		2017/0060405	A1	3/2017	Voss et al.	
	2008/0119235 A1 5/2008 Nielsen et al.	2017/0220120	A1	8/2017	Westbrook et al.	
	2009/0012880 A1 1/2009 Tortola	2017/0300216	A1*	10/2017	Helm	G09G 5/00
	2009/0132197 A1 5/2009 Rubin et al.	2017/0337027	A1*	11/2017	Chan	G09G 5/38
	2009/0300537 A1 12/2009 Park	2017/0357390	A1	12/2017	Alonso Ruiz et al.	
	2010/0010648 A1 1/2010 Bull et al.	2017/0357420	A1	12/2017	Dye et al.	
	2010/0060586 A1 3/2010 Pisula et al.	2017/0357421	A1	12/2017	Dye et al.	
	2010/0135637 A1 6/2010 McDermott et al.	2017/0359629	A1	12/2017	Fino et al.	
	2010/0153844 A1 6/2010 Hwang	2018/0005517	A1	1/2018	Hope et al.	
	2010/0229094 A1 9/2010 Nakajima	2018/0088896	A1	3/2018	Olson	
	2010/0235762 A1 9/2010 Laiho	2018/0188945	A1	7/2018	Garmark et al.	
	2011/0138331 A1 6/2011 Pugsley	2018/0189023	A1	7/2018	Garmark	
	2011/0154213 A1 6/2011 Wheatley	2018/0189226	A1	7/2018	Hofverberg et al.	
	2011/0234480 A1 9/2011 Fino et al.	2018/0189278	A1	7/2018	Garmark	
	2011/0285554 A1 11/2011 Aghaei	2018/0191795	A1	7/2018	Oskarsson et al.	
	2011/0296351 A1 12/2011 Ewing, Jr.	2018/0192285	A1	7/2018	Schmidt et al.	
	2012/0001843 A1 1/2012 Gravino	2019/0034048	A1*	1/2019	Gibbons	G06F 3/0482
	2012/0034904 A1 2/2012 LeBeau et al.					
	2012/0179967 A1 7/2012 Hayes					
	2012/0179970 A1 7/2012 Hayes					

* cited by examiner

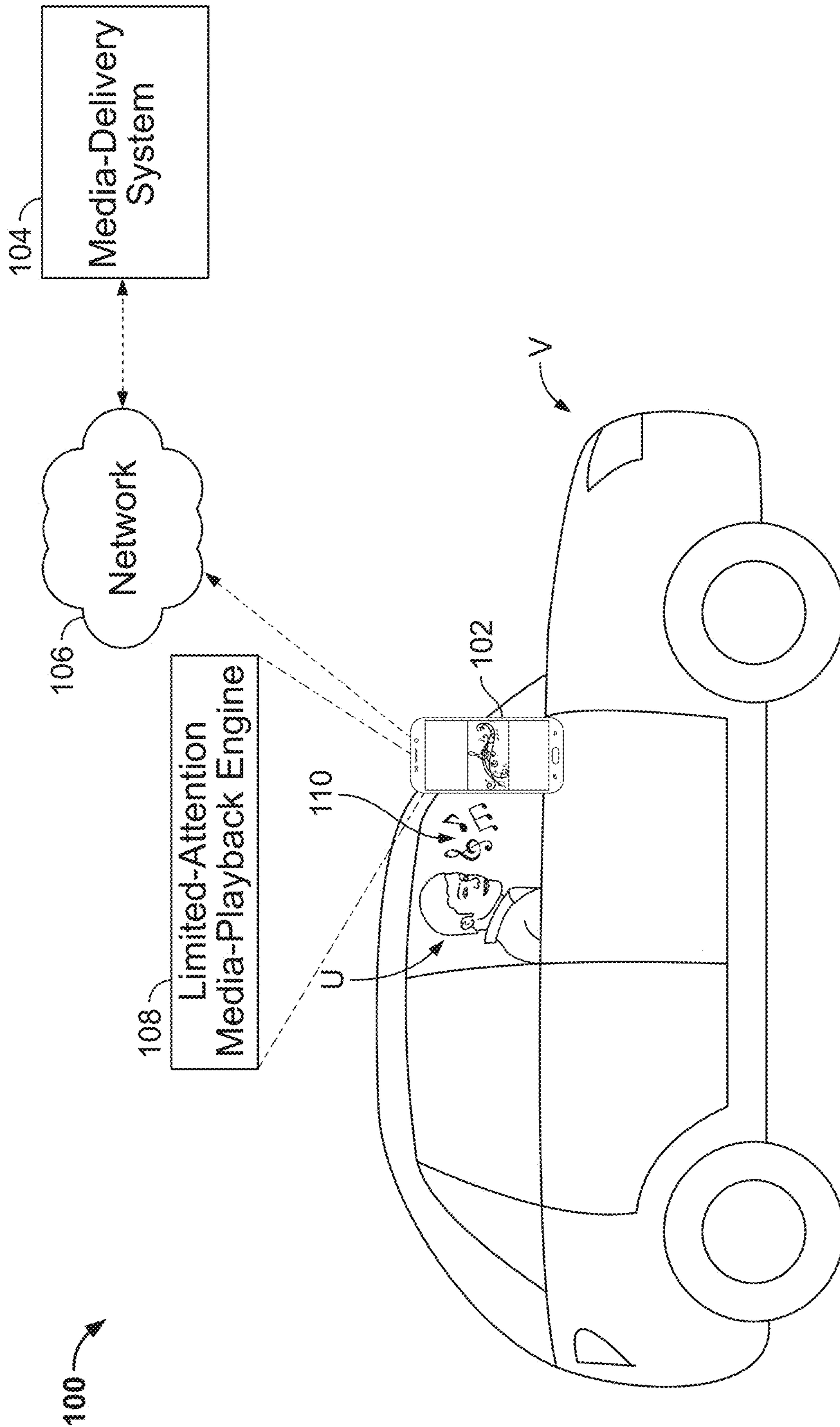


FIG. 1

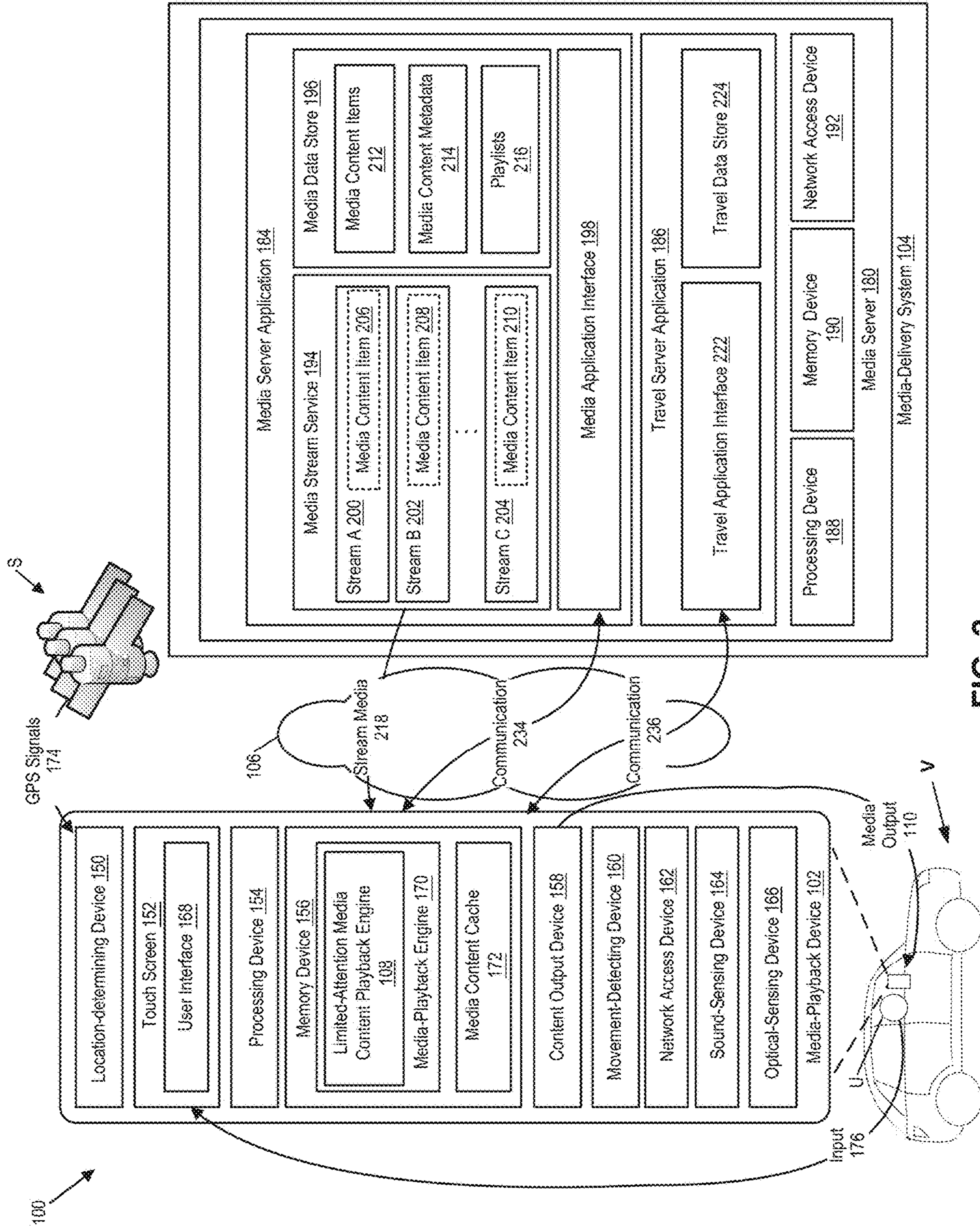


FIG. 2

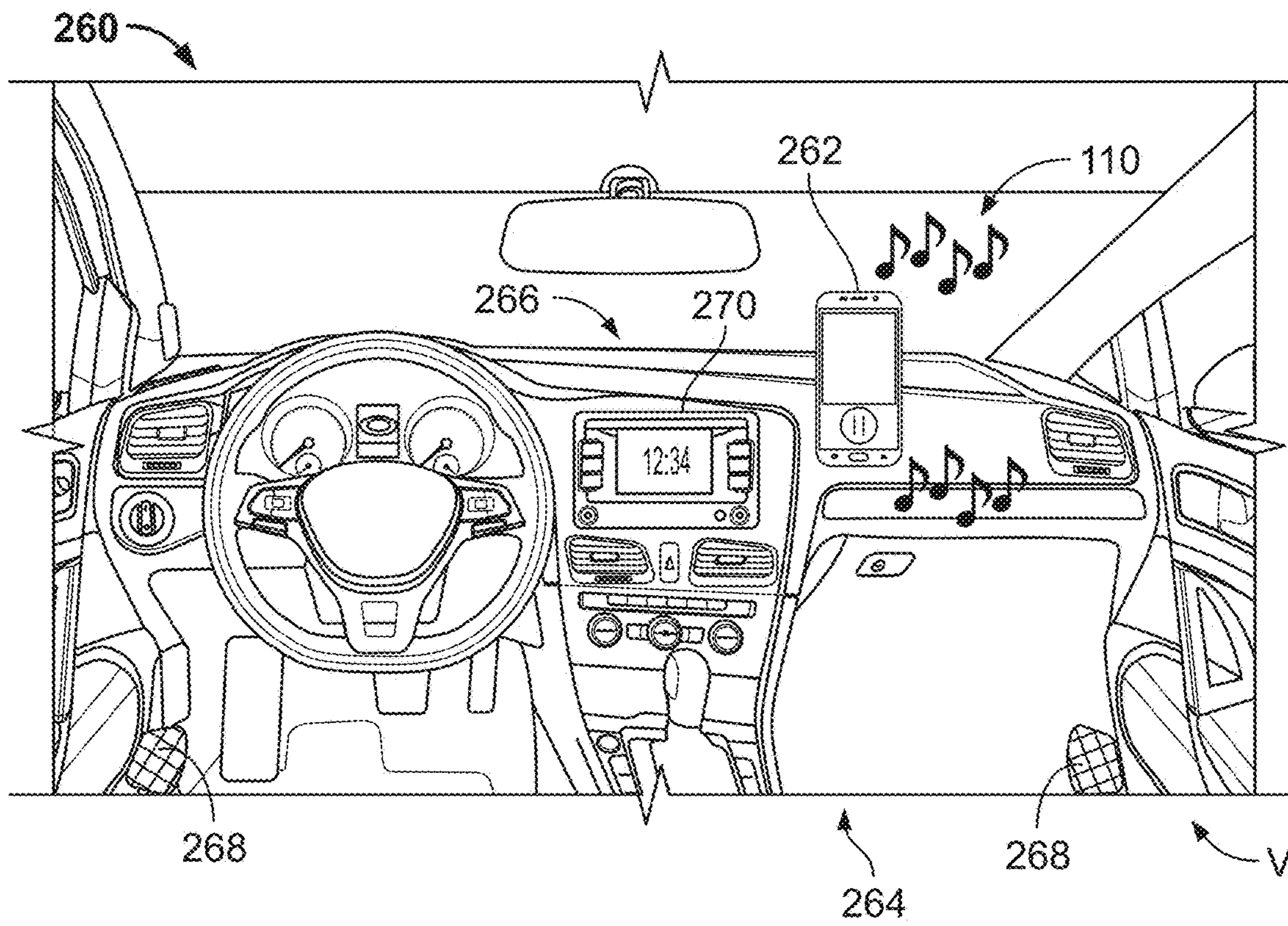


FIG. 3A

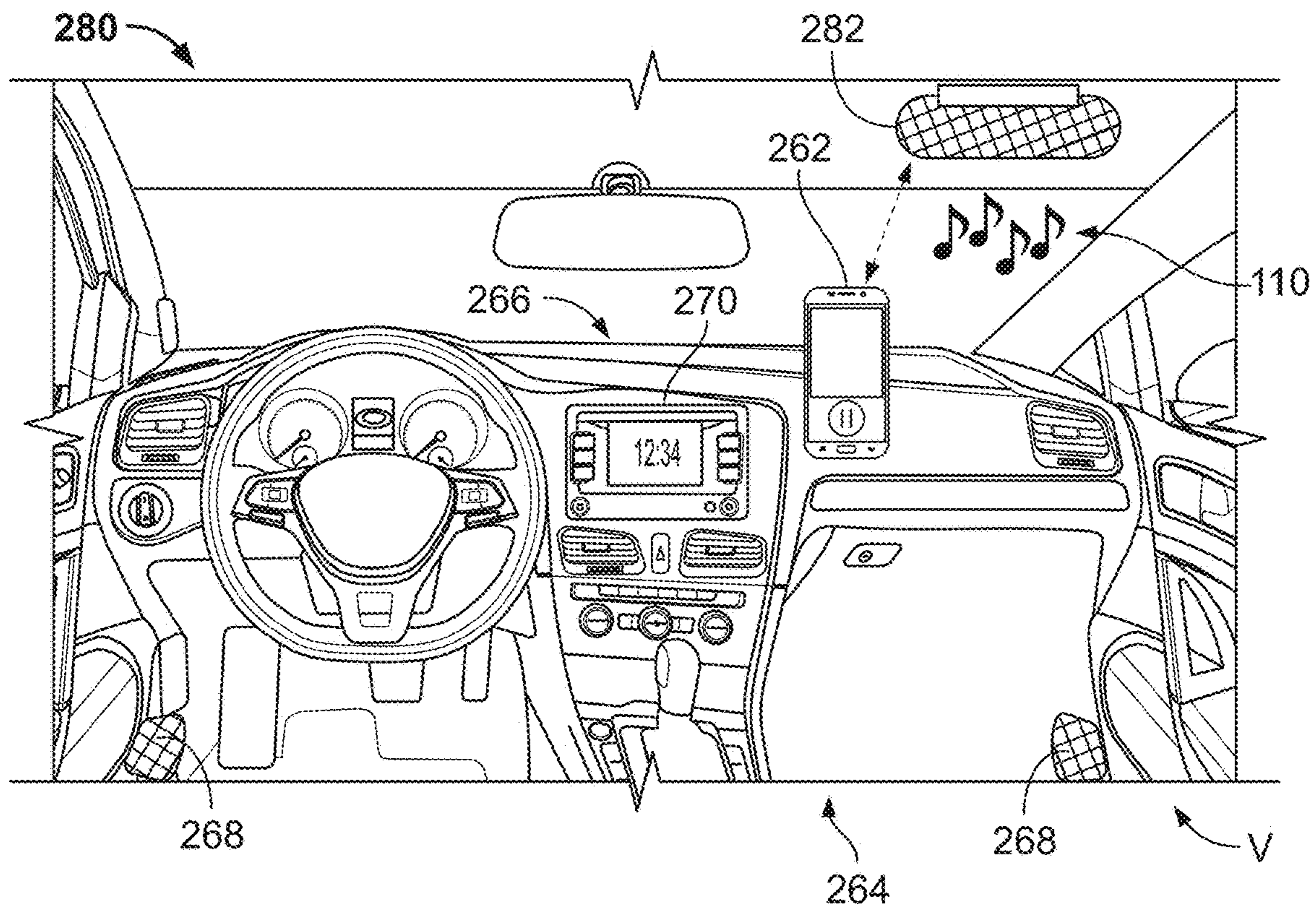


FIG. 3B

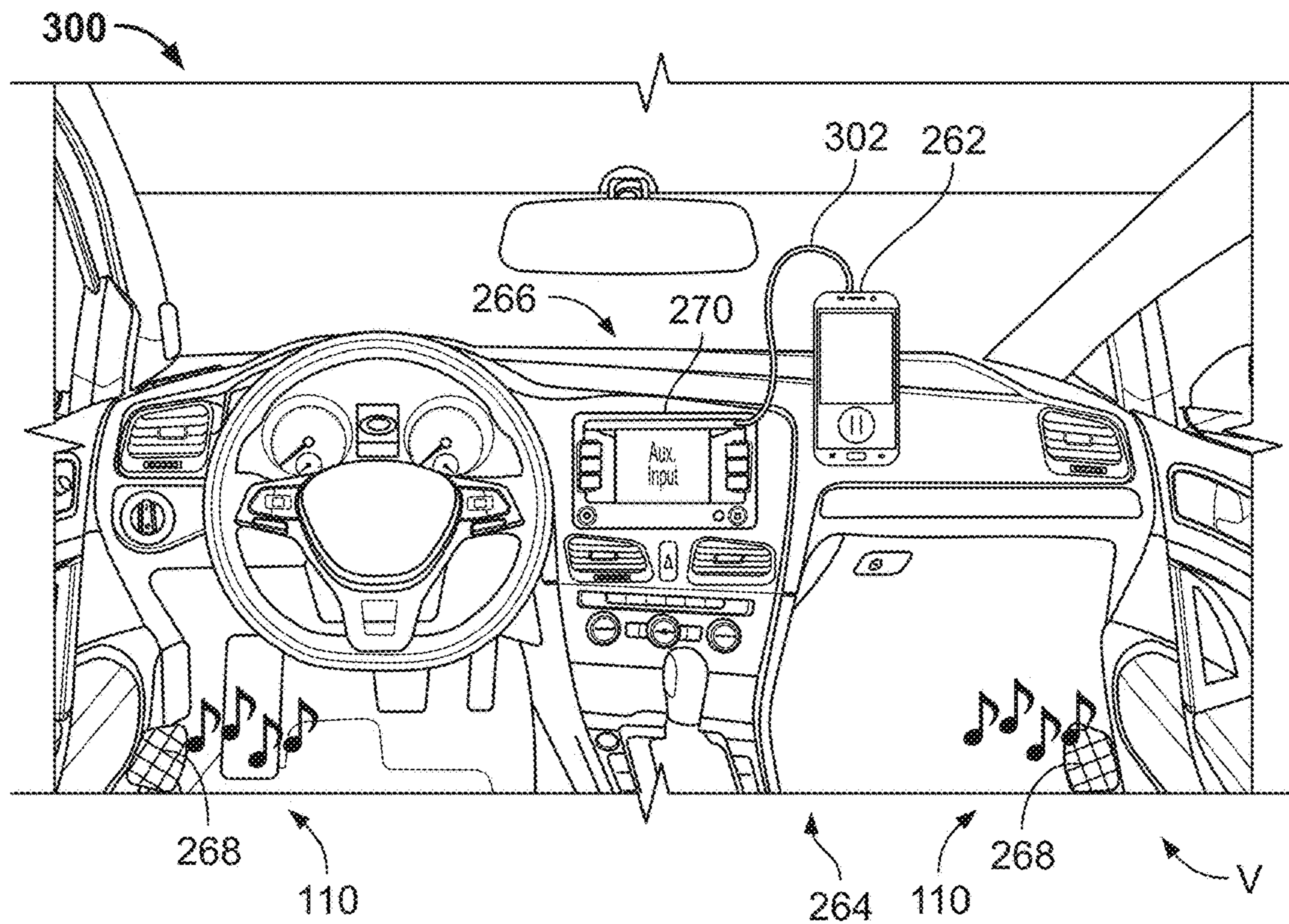


FIG. 3C

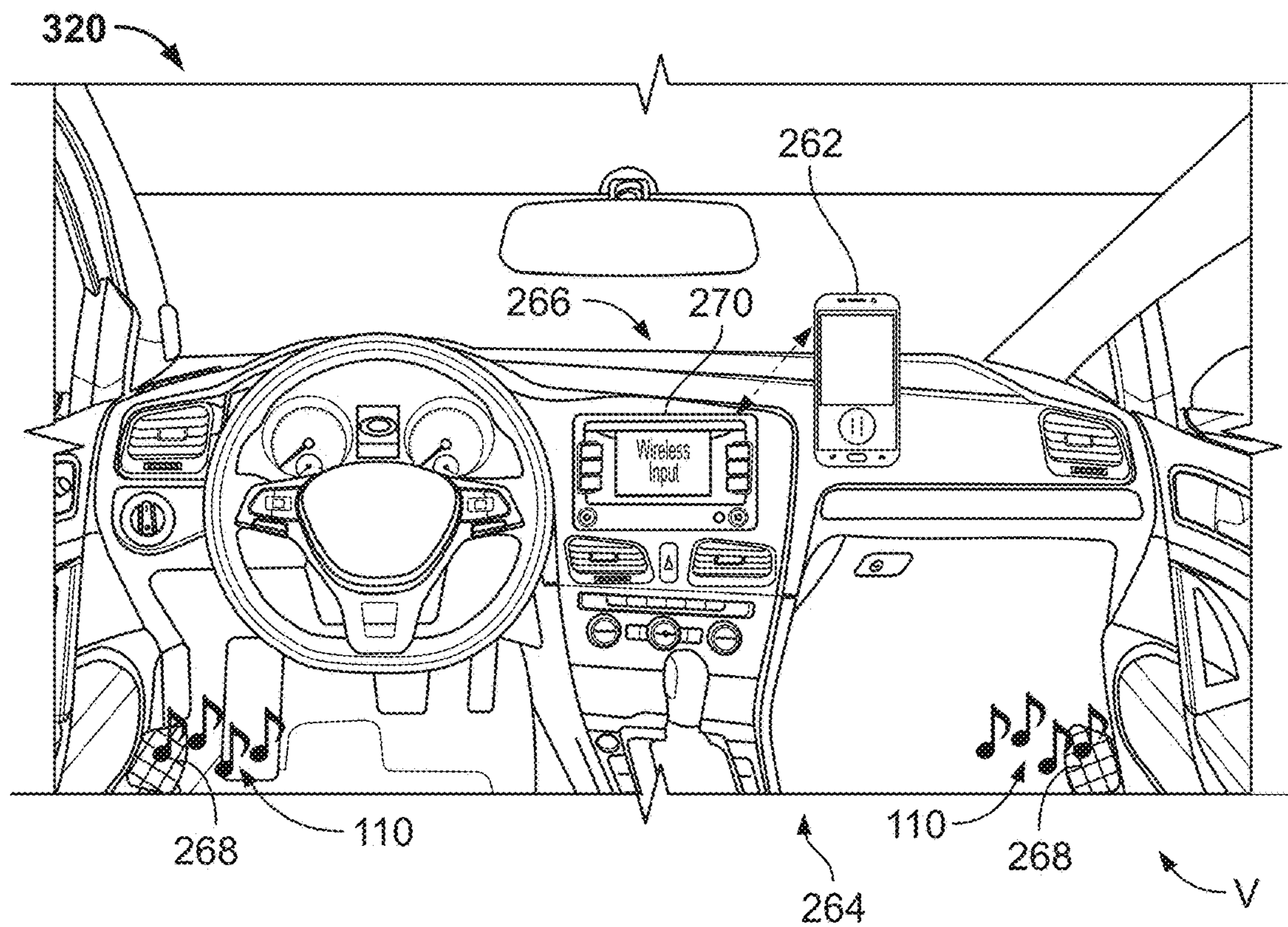


FIG. 3D

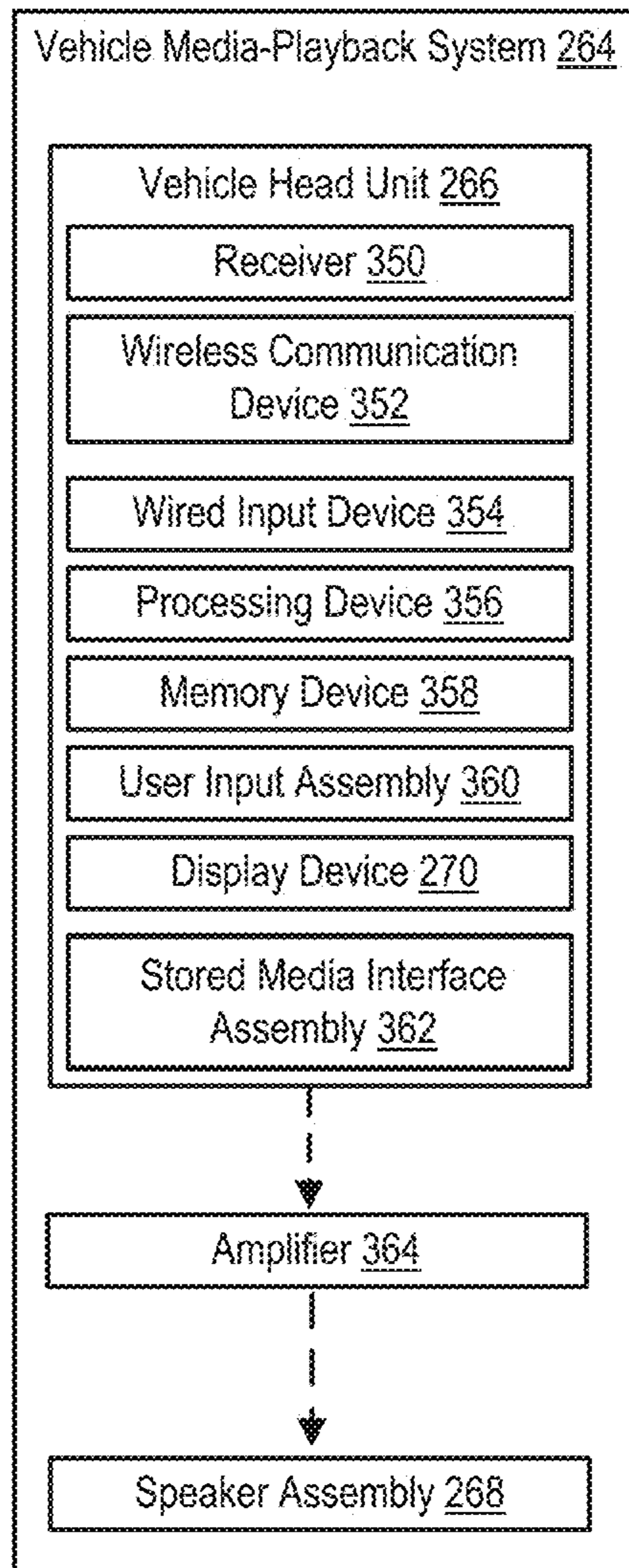


FIG. 4

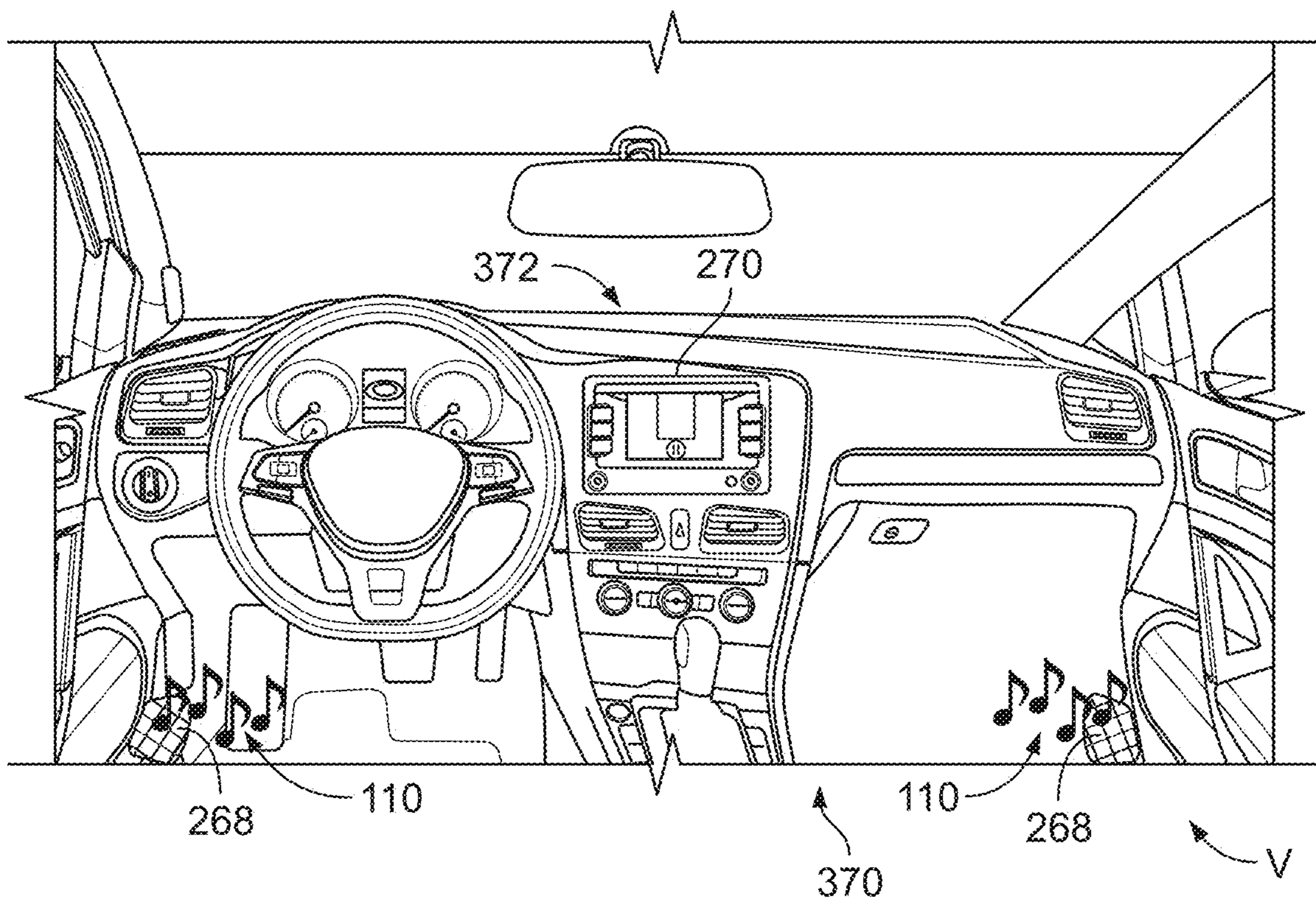


FIG. 5

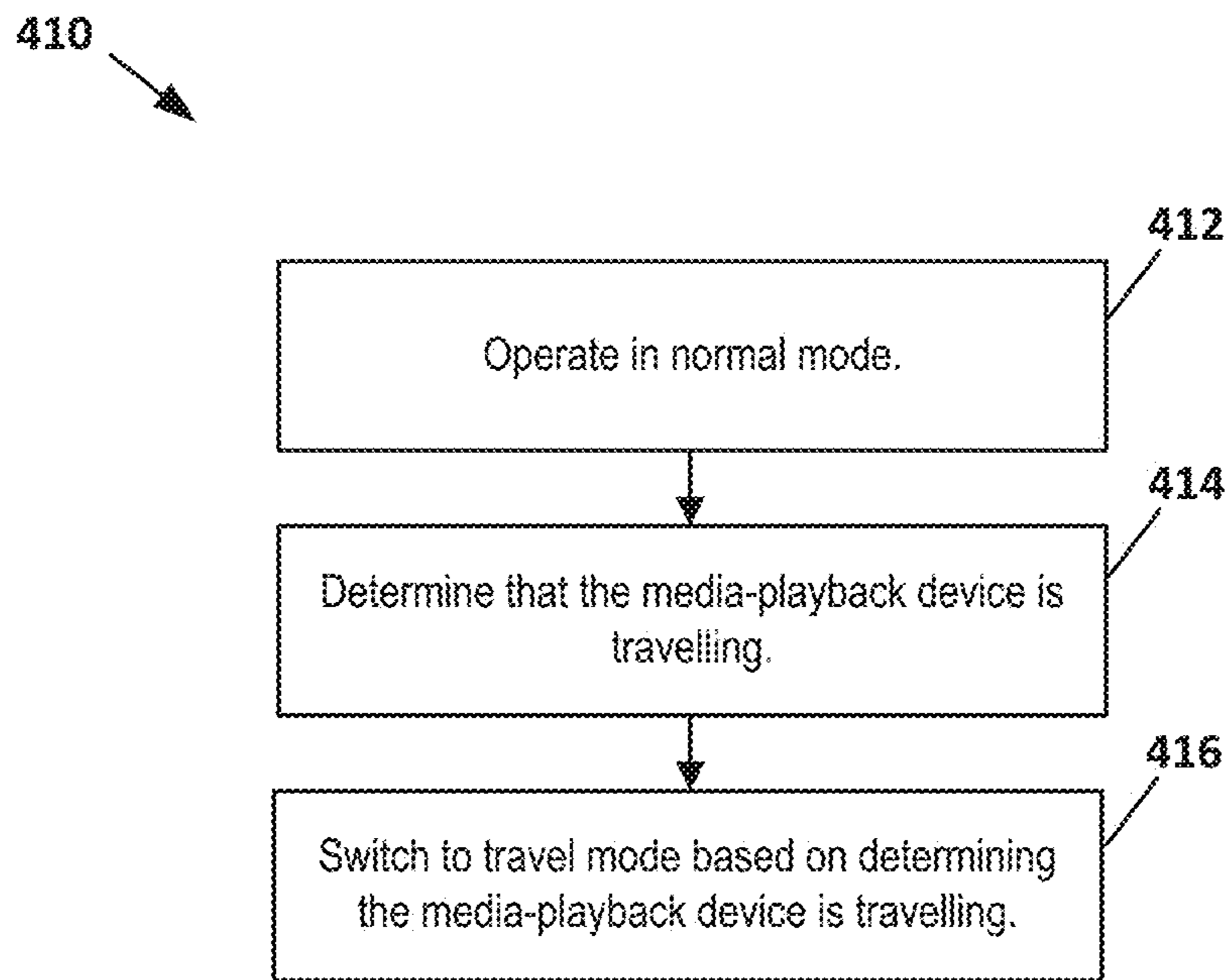


FIG. 6

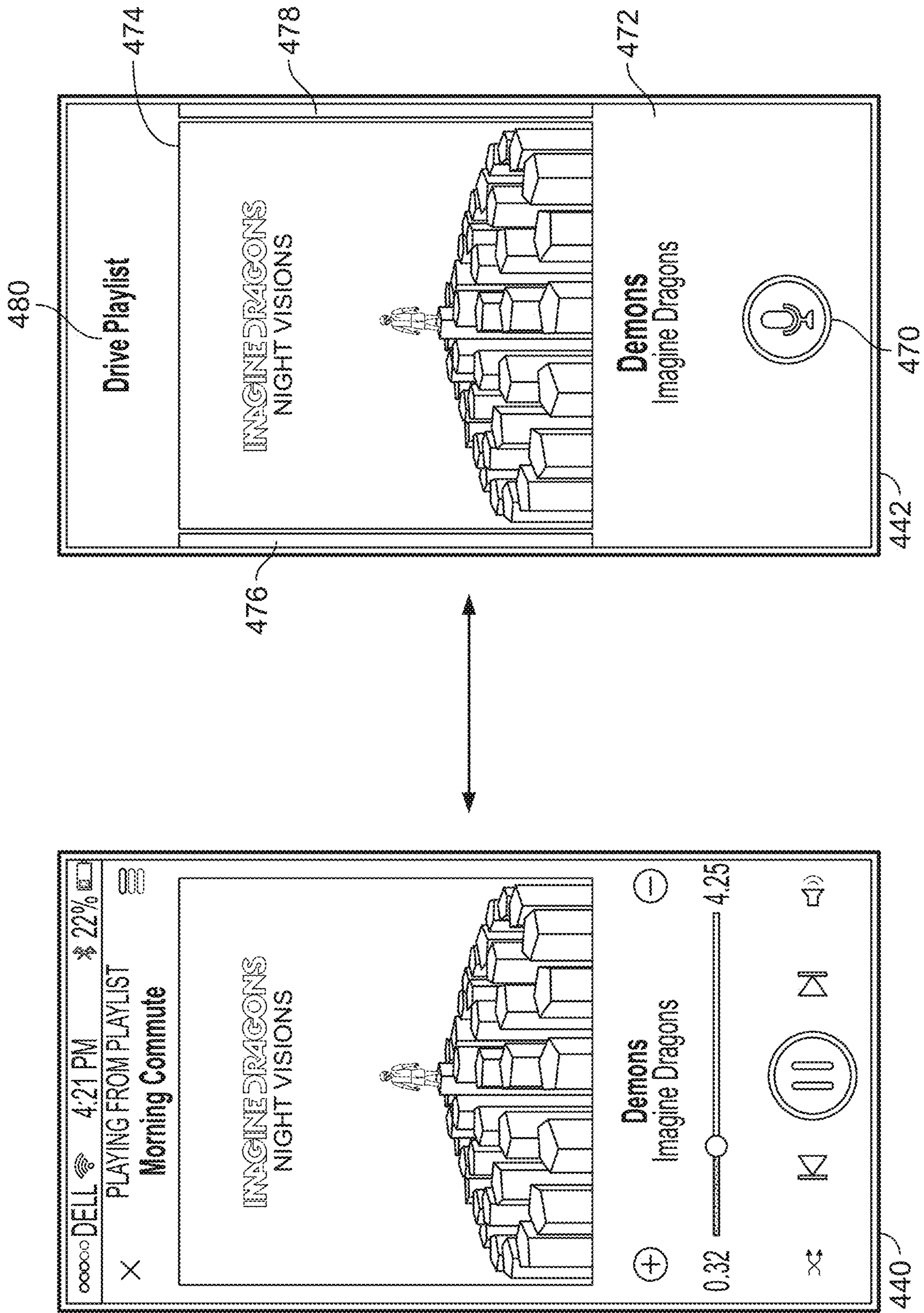


FIG. 7

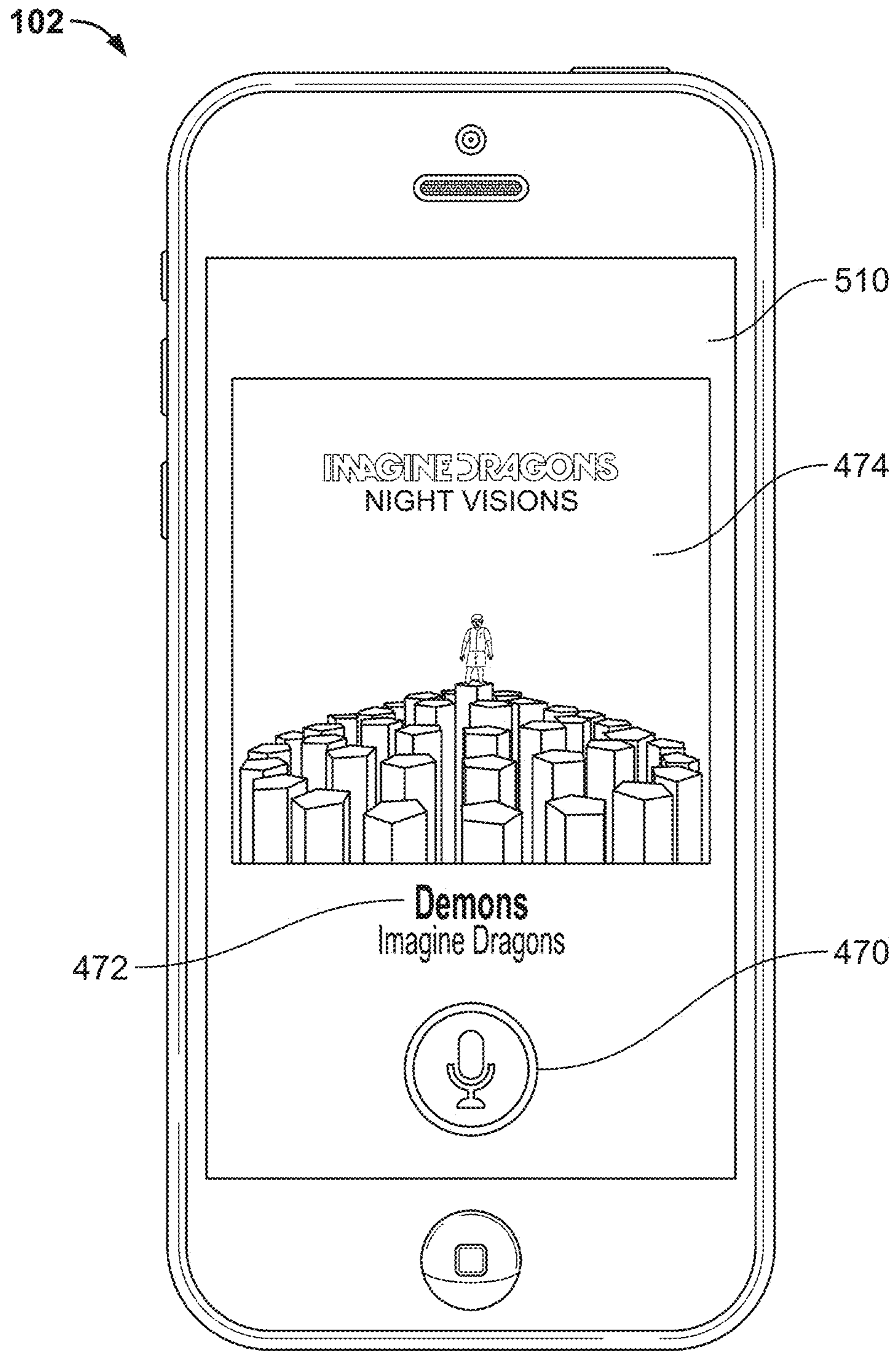


FIG. 8

550

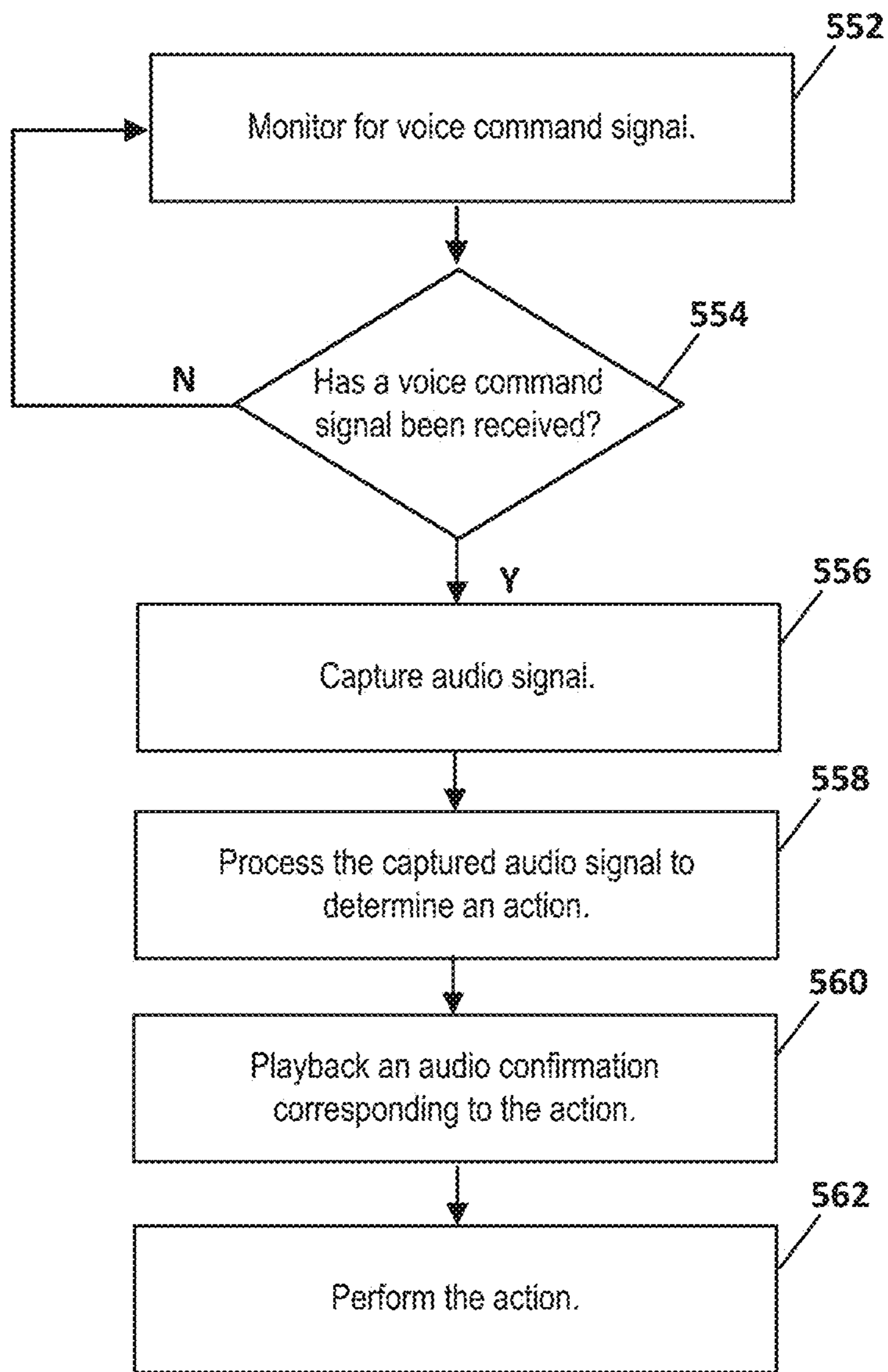
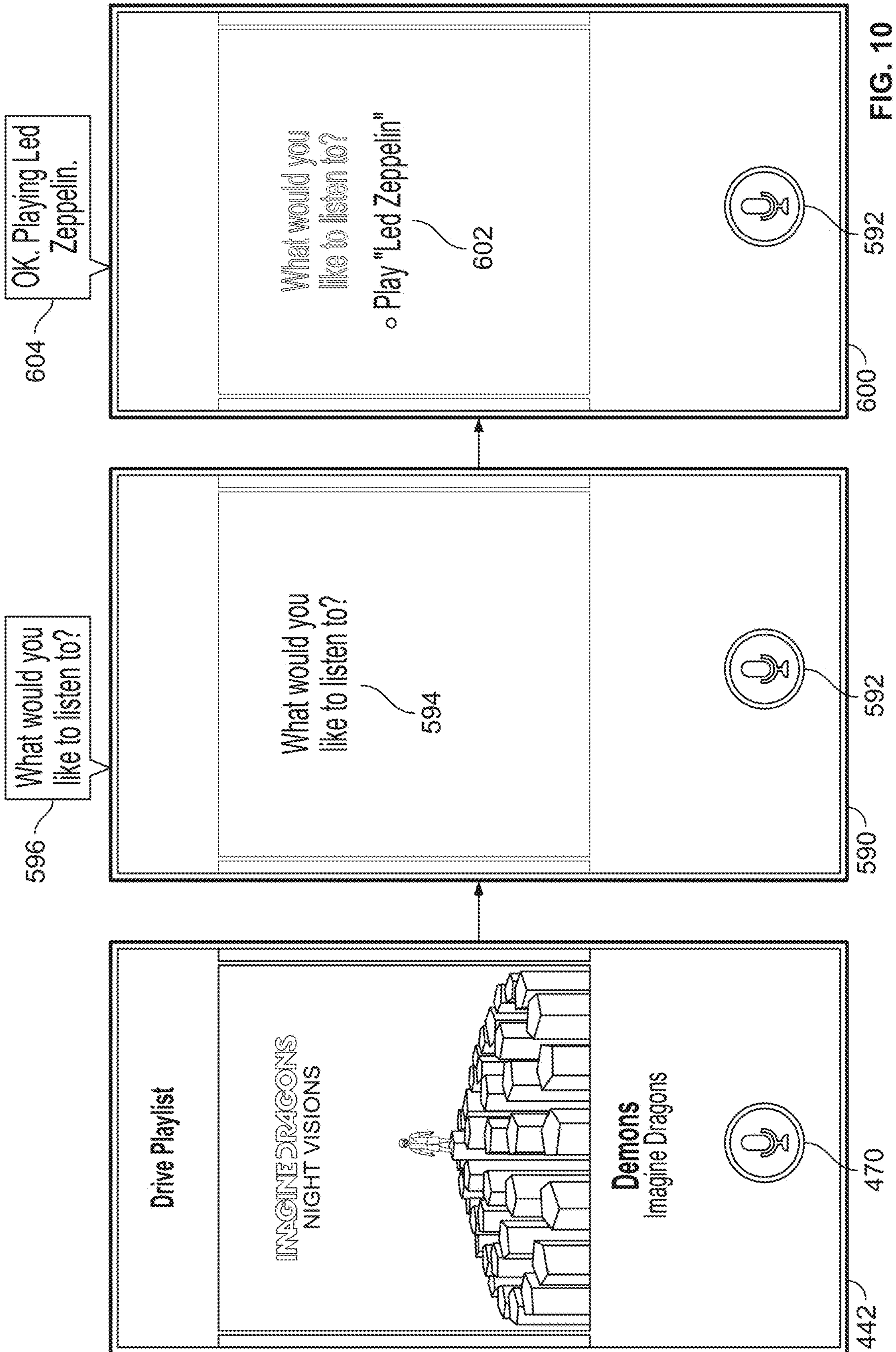


FIG. 9



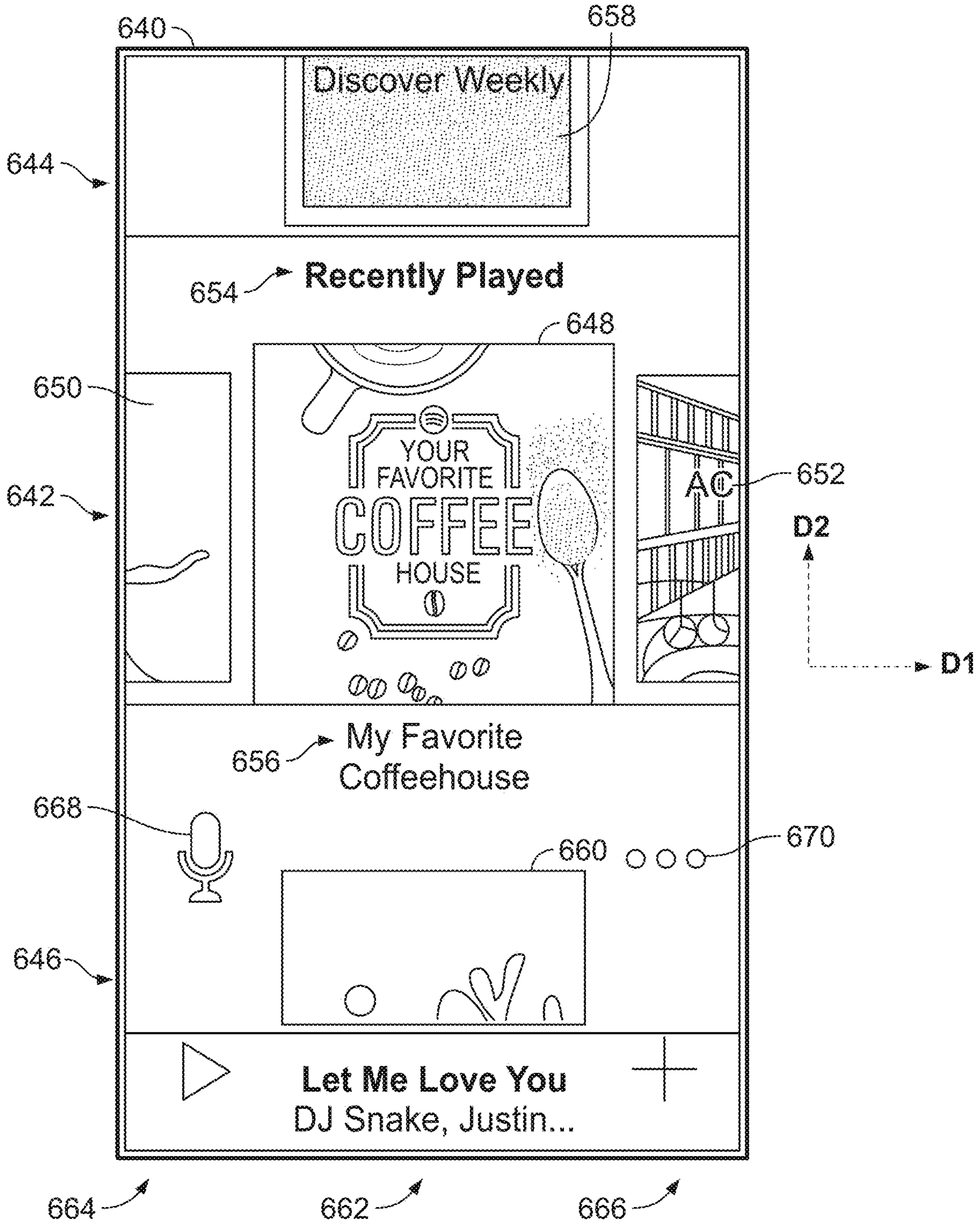


FIG. 11

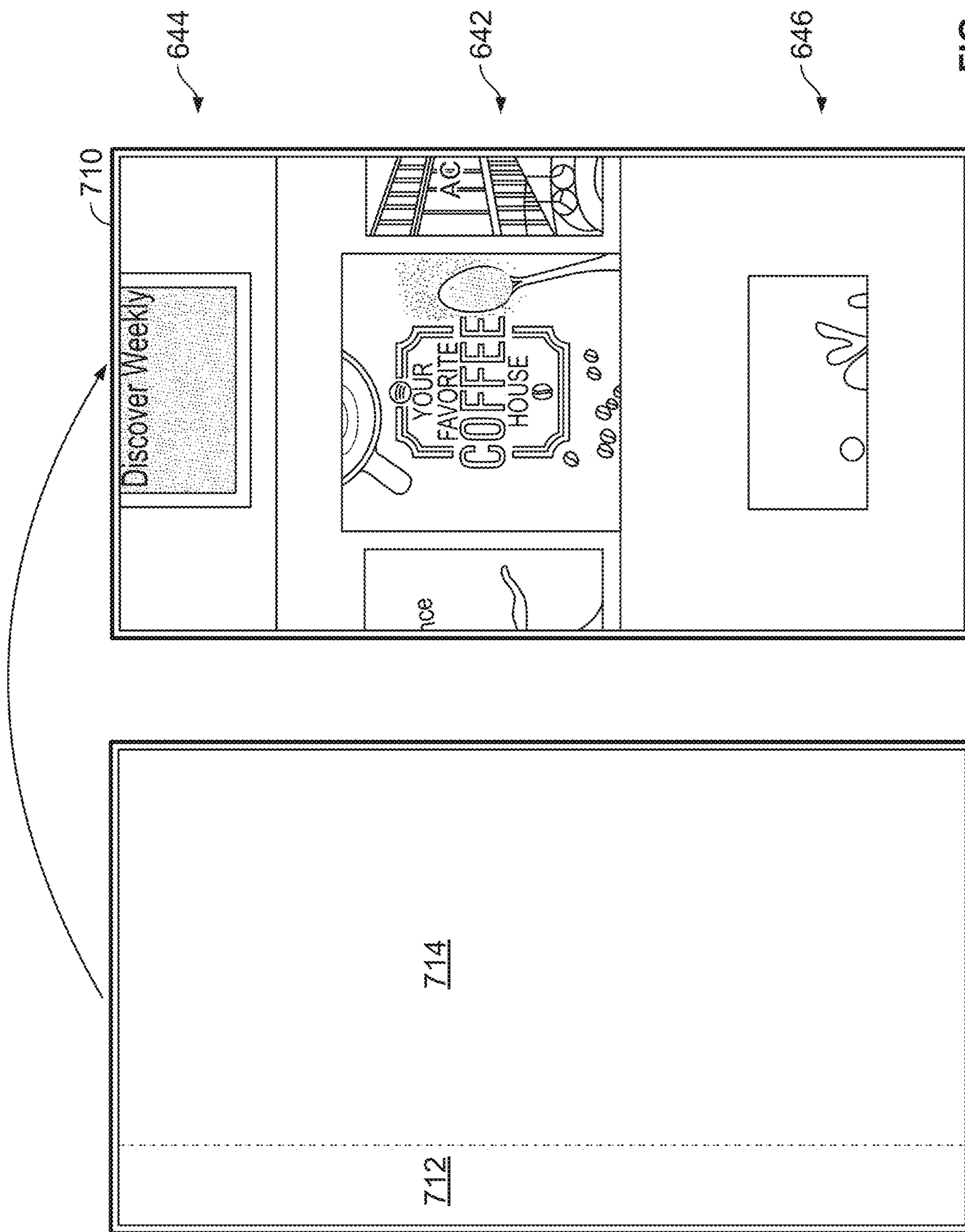


FIG. 12

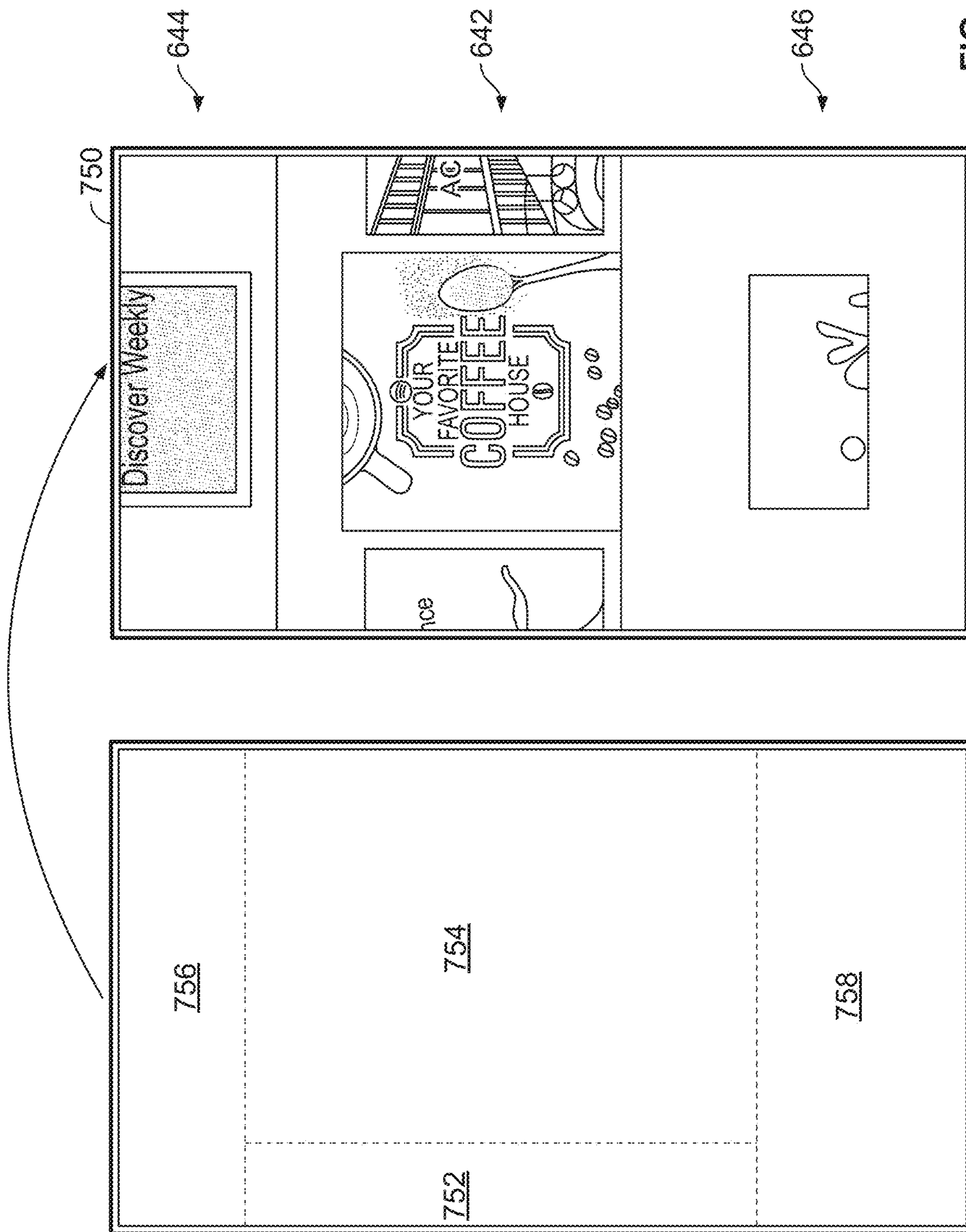


FIG. 13



FIG. 14

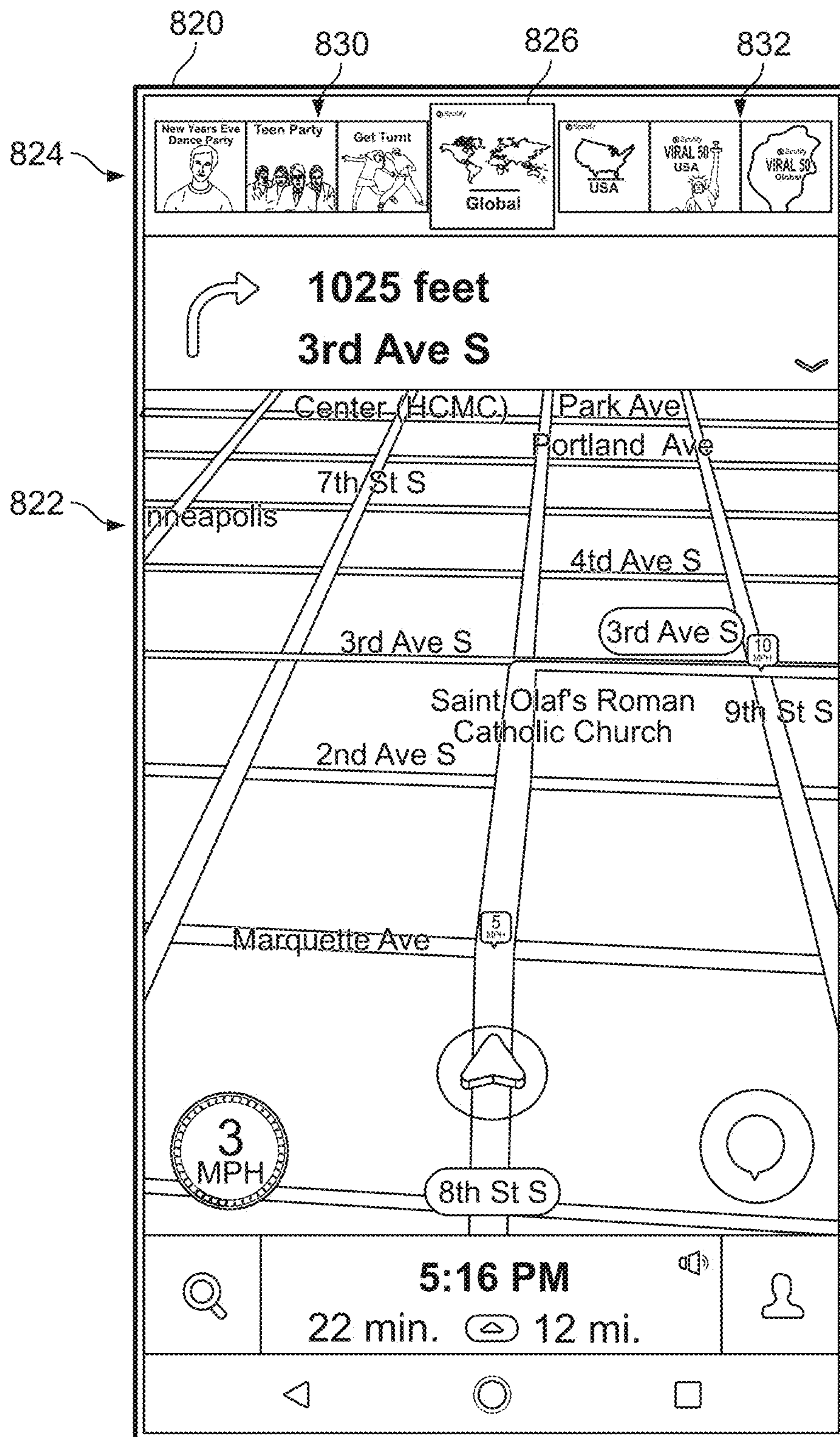


FIG. 15

1**MEDIA CONTENT PLAYBACK DURING TRAVEL****CROSS-REFERENCE TO RELATED APPLICATIONS**

This application is a Continuation of U.S. application Ser. No. 15/858,527, filed on Dec. 29, 2017, which claims the benefit of U.S. Provisional Application No. 62/441,299, filed on Dec. 31, 2016, the disclosures of which are hereby incorporated by reference in their entireties. To the extent appropriate a claim of priority is made to each of the applications listed above.

BACKGROUND

Many people enjoy consuming media content while travelling or during other activities. The media content can include audio content, video content, or other types of media content. Examples of audio content include songs, albums, podcasts, audiobooks, etc. Examples of video content include movies, music videos, television episodes, etc. Using a mobile phone or other media-playback device, such as a vehicle-integrated media playback device, a person can access large catalogs of media content. For example, a user can access an almost limitless catalog of media content through various free and subscription-based streaming services. Additionally, a user can store a large catalog of media content on his or her mobile device.

This nearly limitless access to media content introduces new challenges for users. For example, it may be difficult to find or select desired media content or media content that complements a particular moment while travelling.

SUMMARY

In general terms, this disclosure is directed to media content playback for enhancing travel. In one possible configuration and by non-limiting example, a media-playback device generates a user interface that is specifically configured to enhance selection and playback of media content items during travel. Various aspects are described in this disclosure, which include, but are not limited to, the following aspects.

In one aspect, a method of generating a user interface for a media playback device, the method comprising: displaying a first user interface screen in a first display format, the first display format including graphical representations of a plurality of selectable controls; determining that the media playback device is travelling; after determining that the media playback device is travelling, converting the first user interface screen to a second display format, wherein the second display format includes fewer graphical representations of the plurality of selectable controls than the first display format.

In another aspect, a media playback device comprising: an audio output device for media playback; a touch-sensitive display; a processor; a computer-readable storage device storing data instructions, which when executed by the processor, cause the processor to: playing a media content item using the audio output device; generating a graphical user interface on the touch-sensitive display including a quantity of selectable controls; determining that the media playback device is travelling; converting the graphical user interface to a simplified graphical user interface including a lesser quantity of selectable controls based on the determination that the media playback device is travelling.

2

In yet another aspect, a media playback device comprising: an audio output device for media playback; a touch-sensitive display; a processor; a computer-readable storage device storing data instructions, which when executed by the processor, cause the processor to: playing a media content item using the audio output device; generating a graphical user interface on the touch-sensitive display, the graphical user interface displaying a graphic associated with the media content item that is playing and being free of any graphical representation of a media playback control; receiving user input on the graphical user interface through the touch-sensitive display without displaying any graphical representation of a media playback control; and adjusting playback through the audio output device based on the input.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates an example media-playback system for media content playback during travel.

FIG. 2 is a schematic illustration of the example media-playback system of FIG. 1.

FIG. 3A is a schematic diagram of an embodiment of the media-playback system of FIG. 1.

FIG. 3B is a schematic diagram of another embodiment of the media-playback system of FIG. 1.

FIG. 3C is a schematic diagram of another embodiment of the media-playback system of FIG. 1.

FIG. 3D is a schematic diagram of another embodiment of the media-playback system of FIG. 1.

FIG. 4 is a schematic diagram of an embodiment of the vehicle media-playback system of FIG. 3A.

FIG. 5 is a schematic diagram of an embodiment of a vehicle media-playback system that incorporates a media-playback device.

FIG. 6 illustrates an example method of media content playback during travel performed by some embodiments of the media-playback device of FIG. 1.

FIG. 7 includes schematic diagrams of a normal-mode user interface screen and a travel-mode user interface screen that are generated and displayed by some embodiments of the media-playback device of FIG. 1.

FIG. 8 is a schematic diagram of another embodiment of a user interface screen generated by some embodiments of the media-playback device of FIG. 1 when operating in a travel mode.

FIG. 9 illustrates an example method of receiving voice command input by a media content playback during travel performed by some embodiments of the media-playback device of FIG. 1.

FIG. 10 includes schematic diagrams of series of example user interface screens generated and shown in travel mode during a voice command interaction with a user by some embodiments of the media-playback device of FIG. 1.

FIG. 11 is a schematic diagram of another embodiment of a user interface screen generated by some embodiments of the media-playback device of FIG. 1 when operating in a travel mode.

FIG. 12 is a schematic diagram of another embodiment of a user interface screen generated by some embodiments of the media-playback device of FIG. 1 when operating in a travel mode.

FIG. 13 is a schematic diagram of another embodiment of a user interface screen generated by some embodiments of the media-playback device of FIG. 1 when the operating in a travel mode.

FIG. 14 is a schematic diagram of another embodiment of a user interface screen generated by some embodiments of the media-playback device of FIG. 1 when operating in a travel mode.

FIG. 15 is a schematic diagram of another embodiment of a user interface screen generated by some embodiments of the media-playback device of FIG. 1 when operating in a travel mode.

DETAILED DESCRIPTION

Various embodiments will be described in detail with reference to the drawings, wherein like reference numerals represent like parts and assemblies throughout the several views. Reference to various embodiments does not limit the scope of the claims attached hereto. Additionally, any examples set forth in this specification are not intended to be limiting and merely set forth some of the many possible embodiments for the appended claims.

Users of media-playback devices often consume media content during various activities, including travelling. As used herein, the term “travel” and variants thereof refers to any activity in which a user is in transit between two locations. For example, a user is in transit when being conveyed by a vehicle, including motorized and non-motorized, public transit and private vehicles. A user is also in transit when moving between locations by other means such as walking and running.

Enjoying media content while travelling presents many challenges. First, it can be difficult to safely interact with a media-playback device while travelling in a manner that does not interfere with travel related activities (driving, navigating, etc.). Second, desired media content may not be available or accessible in a format that can be accessed while travelling. Third, accessing media content while travelling may be difficult, expensive, or impossible depending on network availability/capacity along the route of travel. Fourth, accessing and playing back media content can require significant amounts of energy, potentially draining a battery in the media-playback device. Fifth, it can be challenging to connect a media-playback device to a vehicle-embedded audio system for playback while travelling in a vehicle. Embodiments disclosed herein address some or all of these challenges. It should be understood, however, that aspects described herein are not limited to use during travel.

For example, in some embodiments, the media-playback device includes a limited-attention interface that requires less attention from the user and/or is less distracting than a standard interface. This limited-attention interface can be useful during travel because a user may have limited attention available for interacting with a media-playback device due to the need to concentrate on travel related activities, including for example driving and navigating. But the limited-attention interface can also be configured for use playing back media content during other activities that require the user’s concentration, such as exercising, playing games, operating heavy equipment, reading, studying, etc.

Consuming media content may include one or more of listening to audio content, watching video content, or consuming other types of media content. For ease of explanation, the embodiments described in this application are presented using specific examples. For example, audio content (and in particular music) is described as an example of one form of media consumption. As another example, travelling (and in particular driving) is described as one example of an activity during which media content is consumed. However, it should be understood that the same concepts are

similarly applicable to other forms of media consumption and to other activities, and at least some embodiments include other forms of media consumption and/or are configured for use during other activities.

FIG. 1 illustrates an example media-playback system 100 for media content playback during travel. The example system 100 includes a media-playback device 102 and a media-delivery system 104. The media-playback device 102 includes a limited-attention media-playback engine 108. The system 100 communicates across a network 106. Also shown, is a user U who is travelling in a vehicle V.

The media-playback device 102 plays back media content items to produce media output 110. In some embodiments, the media content items are provided by the media-delivery system 104 and transmitted to the media-playback device 102 using the network 106. A media content item is an item of media content, including audio, video, or other types of media content, which may be stored in any format suitable for storing media content. Non-limiting examples of media content items include songs, albums, audiobooks, music videos, movies, television episodes, podcasts, other types of audio or video content, and portions or combinations thereof.

The media-playback device 102 plays media content for the user during travel or other activities. The media content that is played back may be selected based on user input or may be selected without user input. The media content may be selected for playback without user input by either the media-playback device 102 or the media-delivery system 104. For example, media content can be selected for playback without user input based on stored user profile information, location, travel conditions, current events, and other criteria. User profile information includes but is not limited to user preferences and historical information about the user’s consumption of media content. User profile information can also include libraries and/or playlists of media content items associated with the user. User profile information can also include information about the user’s relationships with other users (e.g., associations between users that are stored by the media-delivery system 104 or on a separate social media site). Although the media-playback device 102 is shown as a separate device in FIG. 1, the media-playback device 102 can also be integrated with the vehicle (e.g., as part of a dash-mounted vehicle infotainment system).

The limited-attention media-playback engine 108 generates interfaces for selecting and playing back media content items. In at least some embodiments, the limited-attention media-playback engine 108 generates interfaces that are configured to be less distracting to a user and require less attention from the user than a standard interface. Embodiments of the limited-attention media-playback engine 108 are illustrated and described further throughout.

FIG. 2 is a schematic illustration of an example system 100 for media content playback during travel. In FIG. 2, the media-playback device 102, the media-delivery system 104, and the network 106 are shown. Also shown are the user U in the vehicle V, and satellites S.

As noted above, the media-playback device 102 plays media content items. In some embodiments, the media-playback device 102 plays media content items that are provided (e.g., streamed, transmitted, etc.) by a system external to the media-playback device such as the media-delivery system 104, another system, or a peer device. Alternatively, in some embodiments, the media-playback device 102 plays media content items stored locally on the media-playback device 102. Further, in at least some

embodiments, the media-playback device **102** plays media content items that are stored locally as well as media content items provided by other systems.

In some embodiments, the media-playback device **102** is a computing device, handheld entertainment device, smart-phone, tablet, watch, wearable device, or any other type of device capable of playing media content. In yet other embodiments, the media-playback device **102** is an in-dash vehicle computer, laptop computer, desktop computer, television, gaming console, set-top box, network appliance, BLU-RAY DISC player, DVD player, media player, stereo, or radio.

In at least some embodiments, the media-playback device **102** includes a location-determining device **150**, a touch screen **152**, a processing device **154**, a memory device **156**, a content output device **158**, a movement-detecting device **160**, a network access device **162**, a sound-sensing device **164**, and an optical-sensing device **166**. Other embodiments may include additional, different, or fewer components. For example, some embodiments do not include one or more of the location-determining device **150**, the touch screen **152**, the sound-sensing device **164**, and the optical-sensing device **166**.

The location-determining device **150** is a device that determines the location of the media-playback device **102**. In some embodiments, the location-determining device **150** uses one or more of the following technologies: Global Positioning System (GPS) technology that may receive GPS signals **174** from satellites **S**, cellular triangulation technology, network-based location identification technology, wireless network technology (e.g., WI-FI) positioning systems technology, and combinations thereof.

The touch screen **152** operates to receive an input **176** from a selector (e.g., a finger, stylus, etc.) controlled by the user **U**. In some embodiments, the touch screen **152** operates as both a display device and a user input device. In some embodiments, the touch screen **152** detects inputs based on one or both of touches and near-touches. In some embodiments, the touch screen **152** displays a user interface **168** for interacting with the media-playback device **102**. As noted above, some embodiments do not include a touch screen **152**. Some embodiments include a display device and one or more separate user interface devices. Further, some embodiments do not include a display device.

In some embodiments, the processing device **154** comprises one or more central processing units (CPU). In other embodiments, the processing device **154** additionally or alternatively includes one or more digital signal processors, field-programmable gate arrays, or other electronic circuits.

The memory device **156** operates to store data and instructions. In some embodiments, the memory device **156** stores instructions for a media-playback engine **170** that includes the limited-attention media-playback engine **108**. In some embodiments, the media-playback engine **170** selects and plays back media content and generates interfaces for selecting and playing back media content items. As described above, the limited-attention media-playback engine **108** also generates interfaces for selecting and playing back media content items.

In at least some embodiments, the limited-attention media-playback engine **108** generates interfaces that are configured to be less distracting to a user and require less attention from the user than other interfaces generated by the media-playback engine **170**. For example, interface generated by the limited-attention media-playback engine **108** may include fewer features than the other interfaces generated by the media-playback engine **170**. These interfaces

generated by the limited-attention media-playback engine **108** may make it easier for the user to interact with the media-playback device **102** during travel or other activities that require the user's attention.

Some embodiments of the memory device also include a media content cache **172**. The media content cache **172** stores media content items, such as media content items that have been previously received from the media-delivery system **104**. The media content items stored in the media content cache **172** may be stored in an encrypted or unencrypted format. The media content cache **172** can also store decryption keys for some or all of the media content items that are stored in an encrypted format. The media content cache **172** can also store metadata about media content items such as title, artist name, album name, length, genre, mood, era, etc. The media content cache **172** can also store playback information about the media content items, such as the number of times the user has requested to playback the media content item or the current location of playback (e.g., when the media content item is an audiobook, podcast, or the like from which a user may wish to resume playback).

The memory device **156** typically includes at least some form of computer-readable media. Computer readable media includes any available media that can be accessed by the media-playback device **102**. By way of example, computer-readable media include computer readable storage media and computer readable communication media.

Computer readable storage media includes volatile and nonvolatile, removable and non-removable media implemented in any device configured to store information such as computer readable instructions, data structures, program modules, or other data. Computer readable storage media includes, but is not limited to, random access memory, read only memory, electrically erasable programmable read only memory, flash memory and other memory technology, compact disc read only memory, BLU-RAY DISCS, digital versatile discs or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium that can be used to store the desired information and that can be accessed by the media-playback device **102**. In some embodiments, computer readable storage media is non-transitory computer readable storage media.

Computer readable communication media typically embodies computer readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism and includes any information delivery media. The term "modulated data signal" refers to a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, computer readable communication media includes wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, radio frequency, infrared, and other wireless media. Combinations of any of the above are also included within the scope of computer readable media.

The content output device **158** operates to output media content. In some embodiments, the content output device **158** generates media output **110** for the user **U** that is directed into an interior cabin of the vehicle **V**. Examples of the content output device **158** include a speaker assembly comprising one or more speakers, an audio output jack, a BLUETOOTH transmitter, a display panel, and a video output jack. Other embodiments are possible as well. For example, the content output device **158** may transmit a signal through the audio output jack or BLUETOOTH

transmitter that can be used to reproduce an audio signal by a connected or paired device such as headphones, speaker system, or vehicle head unit.

The movement-detecting device **160** senses movement of the media-playback device **102**. In some embodiments, the movement-detecting device **160** also determines an orientation of the media-playback device **102**. In at least some embodiments, the movement-detecting device **160** includes one or more accelerometers or other motion-detecting technologies or orientation-detecting technologies. As an example, the movement-detecting device **160** may determine an orientation of the media-playback device **102** with respect to a primary direction of gravitational acceleration. The movement-detecting device **160** may detect changes in the determined orientation and interpret those changes as indicating movement of the media-playback device **102**. The movement-detecting device **160** may also detect other types of acceleration of the media-playback device and interpret those acceleration as indicating movement of the media-playback device **102** too.

The network access device **162** operates to communicate with other computing devices over one or more networks, such as the network **106**. Examples of the network access device include one or more wired network interfaces and wireless network interfaces. Examples of wireless network interfaces include infrared, BLUETOOTH wireless technology, 802.11a/b/g/n/ac, and cellular or other radio frequency interfaces.

The network **106** is an electronic communication network that facilitates communication between the media-playback device **102** and the media-delivery system **104**. An electronic communication network includes a set of computing devices and links between the computing devices. The computing devices in the network use the links to enable communication among the computing devices in the network. The network **106** can include routers, switches, mobile access points, bridges, hubs, intrusion detection devices, storage devices, standalone server devices, blade server devices, sensors, desktop computers, firewall devices, laptop computers, handheld computers, mobile telephones, vehicular computing devices, and other types of computing devices.

In various embodiments, the network **106** includes various types of links. For example, the network **106** can include wired and/or wireless links, including BLUETOOTH, ultrawideband (UWB), 802.11, ZIGBEE, cellular, and other types of wireless links. Furthermore, in various embodiments, the network **106** is implemented at various scales. For example, the network **106** can be implemented as one or more vehicle area networks, local area networks (LANs), metropolitan area networks, subnets, wide area networks (such as the Internet), or can be implemented at another scale. Further, in some embodiments, the network **106** includes multiple networks, which may be of the same type or of multiple different types.

The sound-sensing device **164** senses sounds proximate the media-playback device **102** (e.g., sounds within a vehicle in which the media-playback device **102** is located). In some embodiments, the sound-sensing device **164** comprises one or more microphones. For example, the sound-sensing device **164** may capture a recording of sounds from proximate the media-playback device **102**. These recordings may be analyzed by the media-playback device **102** using speech-recognition technology to identify words spoken by the user. The words may be recognized as commands from the user that alter the behavior of the media-playback device **102** and the playback of media content by the media-

playback device **102**. The words and/or recordings may also be analyzed by the media-playback device **102** using natural language processing and/or intent-recognition technology to determine appropriate actions to take based on the spoken words. Additionally or alternatively, the sound-sensing device may determine various sound properties about the sounds proximate the user such as volume, dominant frequency or frequencies, etc. These sound properties may be used to make inferences about the environment proximate to the media-playback device **102** such as whether the sensed sounds are likely to correspond to a private vehicle, public transportation, etc. In some embodiments, recordings captured by the sound-sensing device **164** are transmitted to media-delivery system **104** (or another external server) for analysis using speech-recognition and/or intent-recognition technologies.

The optical-sensing device **166** senses optical signals proximate the media-playback device **102**. In some embodiments, the optical-sensing device **166** comprises one or more light sensors or cameras. For example, the optical-sensing device **166** may capture images or videos. The captured images can be processed (by the media-playback device **102** or an external server such as the media-delivery system **104** to which the images are transmitted) to detect gestures, which may then be interpreted as commands to change the playback of media content. Similarly, a light sensor can be used to determine various properties of the environment proximate the user computing device, such as the brightness and primary frequency (or color or warmth) of the light in the environment proximate the media-playback device **102**. These properties of the sensed light may then be used to infer whether the media-playback device **102** is in an indoor environment, an outdoor environment, a private vehicle, public transit, etc.

The media-delivery system **104** comprises one or more computing devices and provides media content items to the media-playback device **102** and, in some embodiments, other media-playback devices as well. The media-delivery system **104** includes a media server **180**. Although FIG. 2 shows a single media server **180**, some embodiments include multiple media servers. In these embodiments, each of the multiple media servers may be identical or similar and may provide similar functionality (e.g., to provide greater capacity and redundancy, or to provide services from multiple geographic locations). Alternatively, in these embodiments, some of the multiple media servers may perform specialized functions to provide specialized services (e.g., services to enhance media content playback during travel or other activities, etc.). Various combinations thereof are possible as well.

The media server **180** transmits stream media **218** to media-playback devices such as the media-playback device **102**. In some embodiments, the media server **180** includes a media server application **184**, a travel server application **186**, a processing device **188**, a memory device **190**, and a network access device **192**. The processing device **188**, memory device **190**, and network access device **192** may be similar to the processing device **154**, memory device **156**, and network access device **162** respectively, which have each been previously described.

In some embodiments, the media server application **184** streams music or other audio, video, or other forms of media content. The media server application **184** includes a media stream service **194**, a media data store **196**, and a media application interface **198**. The media stream service **194**

operates to buffer media content such as media content items **206**, **208**, and **210**, for streaming to one or more streams **200**, **202**, and **204**.

The media application interface **198** can receive requests or other communication from media-playback devices or other systems, to retrieve media content items from the media server **180**. For example, in FIG. 2, the media application interface **198** receives communication **234** from the media-playback engine **170**.

In some embodiments, the media data store **196** stores media content items **212**, media content metadata **214**, and playlists **216**. The media data store **196** may comprise one or more databases and file systems. As noted above, the media content items **212** may be audio, video, or any other type of media content, which may be stored in any format for storing media content.

The media content metadata **214** operates to provide various information associated with the media content items **212**. In some embodiments, the media content metadata **214** includes one or more of title, artist name, album name, length, genre, mood, era, etc. The playlists **216** operate to identify one or more of the media content items **212** and. In some embodiments, the playlists **216** identify a group of the media content items **212** in a particular order. In other embodiments, the playlists **216** merely identify a group of the media content items **212** without specifying a particular order. Some, but not necessarily all, of the media content items **212** included in a particular one of the playlists **216** are associated with a common characteristic such as a common genre, mood, or era. The playlists **216** may include user-created playlists, which may be available to a particular user, a group of users, or to the public.

The travel server application **186** provides travel-specific functionality for providing media content items and interfaces for accessing media content items to media-playback devices. In some embodiments, the travel server application **186** includes a travel application interface **222** and a travel data store **224**.

The travel application interface **222** can receive requests or other communication from media-playback devices or other systems, to retrieve travel information and media content items for playback during travel. For example, in FIG. 2, the travel application interface **222** receives communication **236** from the media-playback engine **170**.

The travel application interface **222** can also generate interfaces that are transmitted to the media-playback device **102** for use by the limited-attention media-playback engine **108**. In some embodiments, the travel application interface **222** generates limited-attention interfaces by modifying other interfaces to identify (e.g., with tags) user interface elements that behave differently or should be rendered differently on a limited-attention interface.

Additionally, the travel server application **186** can process data and user input information received from the media-playback device **102**. In some embodiments, travel server application **186** operates to transmit information about the suitability of one or more media content items for playback during travel. In some embodiments, the travel server application **186** may provide a list of media content items that are suited to particular geographic locations, travel conditions, modes of travel, user preferences, etc.

For example, the travel server application **186** may store metadata and other information that associates media content items with geographic locations, forms of travel, travel conditions, etc. in the travel data store **224**. The travel server application **186** may also store information that associates media content items with an individual's or a group of users'

preferences for consuming that media content during travel in the travel data store **224**. The travel data store **224** may comprise one or more files or databases. The travel data store **224** can also comprise files, tables, or fields in the media data store **196**.

In some embodiments, the travel data store **224** stores travel media metadata. The travel media metadata may include various types of information associated with media content items, such as the media content items **212**. In some embodiments, the travel data store **224** provides information that may be useful for selecting media content items for playback during travel. For example, in some embodiments, the travel data store **224** stores travel scores for media content items that correspond to the suitability of particular media content items for playback during travel. As another example, in some embodiments, the travel data store **224** stores timestamps (e.g., start and end points) that identify portions of media content items that are particularly well-suited for playback during travel (or other activities).

Each of the media-playback device **102** and the media-delivery system **104** can include additional physical computer or hardware resources. In at least some embodiments, the media-playback device **102** communicates with the media-delivery system **104** via the network **106**.

Although in FIG. 2 only a single media-playback device **102** and media-delivery system **104** are shown, in accordance with some embodiments, the media-delivery system **104** can support the simultaneous use of multiple media-playback devices, and the media-playback device can simultaneously access media content from multiple media-delivery systems. Additionally, although FIG. 2 illustrates a streaming media based system for media playback during travel, other embodiments are possible as well. For example, in some embodiments, the media-playback device **102** includes a media data store **196** and the media-playback device **102** is configured to select and playback media content items without accessing the media-delivery system **104**. Further in some embodiments, the media-playback device **102** operates to store previously streamed media content items in a local media data store (e.g., the media content cache **172**).

In at least some embodiments, the media-delivery system **104** can be used to stream, progressively download, or otherwise communicate music, other audio, video, or other forms of media content items to the media-playback device **102** for playback during travel on the media-playback device **102**. In accordance with an embodiment, a user U can direct input **176** to the user interface **168** to issue requests, for example, to playback media content for playback during travel on the media-playback device **102**.

FIG. 3A is a schematic diagram of an embodiment of a media-playback system **260** shown within an interior cabin of the vehicle V. The media-playback system **260** is an example of the media-playback system **100**.

In this example, the media-playback system **260** includes a media-playback device **262**. The media-playback device **262** is an embodiment of the media-playback device **102**. Although not shown in this figure, some embodiments of the media-playback system **260** also include a media-delivery system such as the media-delivery system **104**.

Also shown in this figure, is a vehicle media-playback system **264**. The vehicle media-playback system **264** is capable of generating media output **110** within the interior cabin of the vehicle V. An example of the vehicle media-playback system **264** is illustrated and described with respect to FIG. 4.

11

As shown in FIG. 3A, the vehicle media-playback system 264 includes a vehicle head unit 266 and a speaker assembly 268. The vehicle head unit 266 receives or generates media content signals from one or more sources. As shown in FIG. 2, the vehicle head unit 266 includes a display device 270, which can be used to display information about the selected or available sources of media content. In some embodiments, the display device 270 can also display media content. Typically, the vehicle head unit 266 also includes a user input assembly that is usable to control the vehicle media-playback system 264 and to select a source of media content. The vehicle head unit 266 then transmits those signals to output devices such as the speaker assembly 268 (sometimes via an amplifier). In some embodiments, the vehicle head unit 266 also generates image or video content signals that can be transmitted to the display device 270 or another device for display.

In FIG. 3A, the vehicle media-playback system 264 is not being used to generate media output. Instead, the media-playback device 262 is generating media output 110 directly (e.g., through a speaker or other content output device of the media-playback device 262).

FIG. 3B is a schematic diagram of an embodiment of a media-playback system 280. The media-playback system 280 is an example of the media-playback system 100. The media-playback system 280 includes the media-playback device 262 and an external speaker assembly 282. The vehicle media-playback system 264 is also shown in FIG. 3B.

The external speaker assembly 282 generates media output 110 based on a signal received from the media-playback device 262. The external speaker assembly 282 can include one or more speakers. The external speaker assembly 282 can also include a mechanical apparatus for attachment to the vehicle. Although alternatives are possible, in FIG. 3B, the external speaker assembly 282 is attached to a sun visor of the vehicle.

In some embodiments, the media-playback device 262 connects to the external speaker assembly 282 using BLUETOOTH. The media-playback device 262 then transmits an audio signal to the external speaker assembly 282 via BLUETOOTH, which is then used by the external speaker assembly 282 to generate the media output 110. In some embodiments, the media-playback device 262 and the external speaker assembly 282 communicate using a different wireless protocol. Further, in some embodiments, the media-playback device 262 can transmit a media content signal to the external speaker assembly 282 via a cable (e.g., an analog or digital audio cable, a universal serial bus (USB) cable).

In FIG. 3B, the vehicle media-playback system 264 is not being used to generate media output. Instead, the media-playback device 262 is transmitting a signal to the external speaker assembly 282, which generates the media output 110 without using the vehicle media-playback system 264.

FIG. 3C is a schematic diagram of an embodiment of a media-playback system 300. The media-playback system 300 is an example of the media-playback system 100. The media-playback system 300 includes the media-playback device 262, the vehicle media-playback system 264, and a cable 302.

The cable 302 connects the media-playback device 262 to the vehicle media-playback system 264. Although alternatives are possible, the cable 302 can be an analog audio cable that is connects an audio output device of the media-playback device 262 (e.g., a headphone jack) to a wired input device of the vehicle media-playback system 264 (e.g.,

12

an auxiliary input jack). In alternative embodiments, the cable 302 is a USB cable that connects the media-playback device 262 to the vehicle media-playback system 264.

As shown in FIG. 3C, the display device 270 indicates that the vehicle media-playback system 264 is generating media output 110 based on a signal received from an auxiliary input. The media output 110 is played within the interior cabin of the vehicle by the vehicle media-playback system 264 using the speaker assembly 268.

FIG. 3D is a schematic diagram of an embodiment of a media-playback system 320. The media-playback system 320 is an example of the media-playback system 100. The media-playback system 320 includes the media-playback device 262 and the vehicle media-playback system 264. In this example, the media-playback device 262 and the vehicle media-playback system 264 are connected using a wireless communication protocol. Although alternatives are possible, the media-playback device 262 and the vehicle media-playback system 264 can be connected using BLUETOOTH. As an alternative, the media-playback device 262 and the vehicle media-playback system 264 can be connected via a WI-FI network (e.g., using an 802.11 wireless communication protocols) or another type of wireless connection.

As shown in FIG. 3D, the display device 270 indicates that the vehicle media-playback system 264 is generating media output 110 based on a signal received from a wireless input. The media output 110 is played within the interior cabin of the vehicle by the vehicle media-playback system 264 using the speaker assembly 268.

FIG. 4 is a schematic diagram of an embodiment of the vehicle media-playback system 264. In this example, the vehicle media-playback system 264 includes a vehicle head unit 266, an amplifier 364, and a speaker assembly 268.

The vehicle head unit 266 received user input and generates media content from various sources. In this example, the vehicle head unit 266 includes a receiver 350, a wireless communication device 352, a wired input device 354, a processing device 356, a memory device 358, a user input assembly 360, a display device 270, and a stored media interface assembly 362. The processing device 356 may be similar to the processing device 154 and the memory device 358 may be similar to the memory device 156.

The receiver 350 receives media content signals from various external sources. The received signals can then be used to generate media output by the vehicle media-playback system 264. The receiver 350 may comprise one or more tuners for receiving radio signals such as FM or AM radio signals. Additionally, the receiver 350 may comprise a receiver for receiving satellite radio signals.

The wireless communication device 352 communicates with other devices using wireless data signals. The wireless communication device 352 can include one or more of a BLUETOOTH transceiver and a WI-FI transceiver. The wireless data signal may comprise a media content signal such as an audio or video signal.

The wired input device 354 receives a cable for providing media content and/or commands. In some embodiments, the wired input device 354 can include an auxiliary input jack for receiving a plug that transmits an analog audio signals. The wired input device 354 can also include different or multiple input jacks for receiving plugs that transmit other types of analog or digital signals (e.g., USB, HDMI, composite video, YPbPr, DVI). In some embodiments, the wired input device 354 is also used to receive instructions from other devices.

The user input assembly **360** comprises one or more input devices for providing user input to the vehicle media-playback system **264**. In some embodiments, the user input assembly **360** includes multiple knobs, buttons, and other types of input controls for adjusting volume, selecting sources and content, and adjusting various output parameters. In some embodiments, the various input devices are disposed on or near a front surface of the vehicle head unit **266**. The various input devices can also be disposed on the steering wheel of the vehicle or elsewhere. Additionally or alternatively, the user input assembly **360** can include one or more touch sensitive surfaces, which can be incorporated in the display device **270**.

The display device **270** displays information. In some embodiments, the display device **270** includes a liquid crystal display (LCD) panel for displaying textual information about content and/or settings of the vehicle media-playback system **264**. The display device **270** can also include other types of display panels such as a light emitting diode (LED) panel. In some embodiments, the display device **270** can also display image or video content.

The stored media interface assembly **362** reads media content stored on a physical medium. In some embodiments, the stored media interface assembly **362** comprises one or more devices for reading media content from a physical medium such as a compact disc or cassette tape.

The amplifier **332** amplifies a signal received from the vehicle head unit **266** and transmits the amplified signal to the speaker assembly **268**. In this manner, the media output **110** can be played back at a greater volume. The amplifier **332** may include a power source to power the amplification.

The speaker assembly **268** produces an audio output based on an electronic signal. The speaker assembly may comprise one or more speakers disposed at various locations within the vehicle. In some embodiments, separate signals are received for at least some of the speakers (e.g., to provide stereo or surround sound).

FIG. **5** is a schematic diagram of an embodiment of a vehicle media-playback system **370** that incorporates a media-playback device. The vehicle media-playback system **370** is an example of the media-playback system **100**. The vehicle media-playback system **370** includes a vehicle head unit **372** and the speaker assembly **268**. In this example, the vehicle head unit **372** incorporates the components and functionality of both a media-playback device such as the media-playback device **102** and a vehicle head unit such as the vehicle head unit **266**. As shown in FIG. **5**, the display device **270** is showing a user interface screen for selecting and playing back media content, which can, for example, be generated by the limited-attention media-playback engine **108**. The media output **110** is played within the interior cabin of the vehicle by the vehicle media-playback system **370** using the speaker assembly **268**. Although alternatives are possible, the vehicle media-playback system **370** often also includes navigation, climate control, and vehicle maintenance capabilities too.

FIG. **6** illustrates an example method **410** of media content playback during travel performed by some embodiments of the media-playback device **102**.

At operation **412**, the media-playback device **102** operates in a normal mode. For example, in the normal mode user interfaces that are feature rich and include many options that may be generated and displayed. The user interfaces generated in normal mode may include user-actuable elements that allow the user to select media content items from large catalogs/lists, search for media content items, curate play-

lists of media content items, download media content items, adjust playback settings, and many other features.

At operation **414**, it is determined that the media-playback device is travelling. Although alternatives are possible, it can be determined that the media-playback device is travelling based on connecting to a vehicle media-playback system (e.g., via BLUETOOTH or an audio output port). In some embodiments, the media-playback device determines that it is connected to a vehicle media-playback system based on a BLUETOOTH-device identifier associated with a device to which it is connected device. In some embodiments, the media-playback device determines that it is travelling based on detecting the movement of the media-playback device (e.g., based on the location-determining device and/or the movement-detecting device). For example, some embodiments determine that media-playback device is travelling when the movement-detecting device detects an acceleration that exceeds a pre-determined threshold. Similarly, some embodiments determine that the media-playback device is travelling based on determining that media-playback device is moving at a speed that exceeds a predetermined threshold (e.g., as determined by a series of measurements by the movement determining device).

Other techniques can be used to determine whether the media-playback device is traveling. These can include one or more techniques described in the following applications, the entireties of which were previously incorporated by reference: U.S. Provisional Patent Application No. 62/441,257, filed on Dec. 31, 2016, entitled "Media Content Playback with State Prediction and Caching"; U.S. Provisional Patent Application No. 62/441,323, filed on Dec. 31, 2016, entitled "Vehicle Detection for Media Content Player Connected to Vehicle Media Content Player"; and U.S. Provisional Patent Application No. 62/441,263, filed on Dec. 31, 2016, entitled "Vehicle Detection for Media Content Player".

At operation **416**, the media-playback device switches to a travel mode based on determining that the media-playback device is travelling. The travel mode may comprise a simplified user interface that is optimized for swipes and voice interaction. In some embodiments, when the media-playback device switches to travel mode a limited-attention user interface is generated. For example, the limited-attention user interface may include fewer user interface elements than the interface that is provided in normal mode. Additionally, the user interface elements that are included in the limited-attention user interface may be larger or otherwise simpler for a user to interact with.

In at least some embodiments, the limited-attention user interface includes a limited set of user interface elements that are related to selecting and playing-back media content. For example, the limited-attention user interface may include commands to skip the currently playing media content item. Additionally, embodiments of the limited-attention user interface include commands to return to a most recently played previous media-content item.

Some embodiments also include user interface elements or are receptive to inputs that switch to a different playlist or group of playlists. For example, some embodiments are configured to switch playlists with a list of playlists based on user input that is a swipe to the left or right on the touchscreen (e.g., the list of playlists may be but do not need to be related to a particular genre, theme, era, or any other grouping, the list of playlists can also be generated based on a user's recent interactions with the media-playback device such as recently played, created, or accessed playlists). Additionally, some embodiments are configured to switch to

a different group of playlists based on a user input that is a swipe up or down on the touchscreen.

In some embodiments, upon entering travel mode the media-playback device begins playing back media content without any further user input (e.g., by resuming playback of a recently played media content item or playlist). In this manner, a user is not required to interact with the media-playback device at all to being playback when the media-playback device is operating in travel mode.

Additionally, in some embodiments, the media playback device generates an audio output that describes the currently playing media content item (e.g., the name of one or more of the currently playing playlist, media content item, artist). The audio output may be generated using text-to-speech technology based on metadata associated with the media content item. However, in some embodiments, the audio output is generated by playing a recording that includes a description (e.g., a recording by the artist, a disc jockey, or a playlist creator).

When operating in travel mode, some embodiments of the media-playback device can receive and respond to voice commands from users. For example, the media-playback device may listen for a certain keyword/phrase (e.g., “Hey Spotify”) that users utter before speaking a command. The user’s speech that follows the keyword/phrase is then recorded and processed (either locally or remotely) to determine an action desired by the user. Some embodiments support a limited set of keyword voice commands (e.g., “skip song,” “next playlist,” “pause,” “play,”). Additionally, some embodiments include intent recognition technology that attempts to determine a user’s intended command based on an unstructured spoken utterance from the user.

Some embodiments also activate an optical-sensing device (e.g., a camera) on the media-playback device in travel mode to capture user input gestures. For example, some embodiments are configured to interpret a side to side wave in front of the media-playback device as a skip command, while an up-and-down wave may be interpreted as a switch groups of playlists command. For example; the input gestures can be recognized using a motion recognition engine from a motion tracking system like the system developed by CRUNCHFISH Ab of Malmö, Sweden, or the KINECT system from MICROSOFT of Redmond, Wash.

In some embodiments the operation 414 also or alternatively determines whether the user is a driver or a passenger. In some embodiments the media-playback device operates in the travel mode when the operation 414 determines that the user is a driver. In other embodiments the media-playback device operates in a first travel mode when the user is a driver, and a second travel mode (different from the first travel mode) when the user is a passenger.

There are a variety of techniques that can be used to determine whether a user is a driver or a passenger. In one embodiment the media-playback device prompts the user to ask the user if he or she is driving, or alternatively whether he or she is a passenger. In some embodiments the system learns from the input provided by the user over time. A current or planned route can also be considered. In this way a routine daily commute from home to work and back or other frequent trips can be learned by the system and used to determine whether the user is a driver or a passenger based on past inputs from the user.

Other input devices of the media playback device can also be used to determine whether the user is a driver or a passenger. For example, the camera can be used to capture an image or video. The image can then be processed to identify a position of the subject or a portion of the subject

in the image. Whether the passenger is on the left or the right side of the vehicle in the image can be determined and used to determine whether the user is a driver or a passenger (e.g., a driver if the user is on the left in many countries). If the image is taken while the user is touching the media-playback device 102, the image may include an image of the person’s arm, and the position and/or shape of the arm in the image can be detected and used to determine the user’s position in the car. Microphones can be used to analyze sounds in the vehicle, and used to predict whether the user is a driver or a passenger. Stereo microphones can also be used to identify the direction of sounds within the vehicle, such as to detect a direction of the user’s voice and therefore the position of the user with respect to the media-playback device 102.

FIG. 7 includes schematic diagrams of a normal-mode user interface screen 440 and a travel-mode user interface screen 442 that are generated and displayed by some embodiments of the media-playback device 102. As can be seen, the normal-mode user interface screen 440 include more user-interface elements than the travel-mode user interface screen 442 and the travel-mode user interface screen 442 includes fewer user-interface elements than the normal-mode user interface screen 440.

For example, the normal-mode user interface screen 440 includes a set of playback controls (e.g., shuffle, previous, play/pause, next) along the bottom of the screen. The normal-mode user interface screen 440 also includes a timeline indicator that shows the current playback location within the media content item, elapsed time, and remaining time. The normal-mode user interface screen 440 displays the media content item name and artist in a first set of font sizes. The normal-mode user interface screen 440 also includes controls for adding the currently playing media content item to a playlist and accessing more information about the currently playing media content item and other related media content items. The normal-mode user interface screen 440 also includes a graphical representation of the currently playing media content item. Additionally, the normal-mode user interface screen 440 includes the title of the currently playing playlist and various controls for interacting with the playlist.

In contrast, the travel-mode user interface screen 442 includes fewer elements than the normal-mode user interface screen 440. In this example, the travel-mode user interface screen 442 includes a voice command control 470, a textual description 472 of the name and artist of the media content item, a graphical representation 474 of the currently playing media content item, a graphical representation 476 of the previous media content item, a graphical representation 478 of the next media content item queued to play, and a textual description 480 of the playlist.

When the voice command control 470 is actuated, the media-playback device 102 captures audio which is then interpreted as a voice command. In some embodiments, the voice command control 470 is actuated with a single touch. In other embodiments, the voice command control 470 is actuated with a long press touch.

The textual description 472 displays the media content item name and artist using a second set of font sizes. In some embodiments, the font sizes in the second set of font sizes are larger than corresponding font sizes in the first set of font sizes used in normal-mode user interface screen 440 (i.e., the font size of the media content item name is larger in travel-mode user interface screen 442 than in the normal-mode user interface screen 440 and the font size of the artist name is larger in travel-mode user interface screen 442 than in normal-mode user interface screen 440).

The graphical representations **476** and **478** show the user the previously played media content item and the upcoming media content item, respectively. The graphical representations **476** and **478** may include an image that corresponds to the respective media content items. As shown in FIG. 7, the graphical representations **476** and **478** are portions of the associated image (e.g., the associated images may be cropped). Specifically, the graphical representation **476** is a rightmost portion of an image corresponding to its associated media content item and the graphical representation **478** is a leftmost portion of an image corresponding to its associated media content item. Although alternatives are possible, the graphical representation **476** may include no more than about 5% of the corresponding image, no more than about 10% of the corresponding image, no more than about 25% of the corresponding image, or no more than a different percentage of the corresponding image. Similarly, the graphical representation **478** may include no more than about 5% of the corresponding image, no more than about 10% of the corresponding image, no more than about 25% of the corresponding image, or no more than a different percentage of the corresponding image.

The textual description **480** of the playlist can include the name of the playlist and/or other information about the playlist, such as the number of media content items in the playlist. In some embodiments, the textual description **480** includes only the name of the playlist so as to minimize the amount of text displayed in travel mode.

In some embodiments, the travel mode interface screen **442** is free of graphical representations of selectable playback controls (e.g., shuffle, previous, play/pause, next), in contrast to the normal-mode user interface **440** in which the selectable playback controls are graphically displayed on the user interface. This provides a greatly simplified appearance. In other possible embodiments the travel mode interface screen **442** contains fewer selectable playback controls than the normal-mode interface screen **440**.

FIG. 8 is a schematic diagram of another embodiment of a user interface screen **510** generated by some embodiments of the media-playback device **102** when the media-playback device **102** is operating in a travel mode. The user interface screen **510** is similar to the travel-mode user interface screen **442** except that the user interface screen **510** includes fewer user interface elements. In this example, the user interface screen **510** includes the voice command control **470**, textual description **472**, and graphical representation **474**. The user interface screen **510** does not include the graphical representation **476**, the graphical representation **478**, and the textual description **480**. It should be understood that other embodiments are possible that include more, fewer, or different elements in the travel mode.

FIG. 9 illustrates an example method **550** of receiving voice command input by a media content playback during travel performed by some embodiments of the media-playback device **102**.

At operation **552**, the media playback device monitors for a voice command signal. Monitoring for a voice command signal can comprise monitoring for a particular keyword or phrase to be spoken as described above. This monitoring may comprise capturing a short audio recording and processing the recording to determine whether the keyword or phrase is included in the recording. In at least some embodiments, the processing is performed locally by the media-playback device **102**. In some examples, the monitoring mode may change responsive to determining the media-playback device **102** is operating in a travel mode. For example, the media-playback device **102** may change from

a non-monitoring mode to a monitoring mode responsive to determining that the media media-playback device is operating in a travel mode. Additionally or alternatively, monitoring for a voice command signal can include monitoring for a particular touch input or gesture. For example, some embodiments include a voice command control on a user interface that when actuated generates a voice command signal.

At operation **554**, it is determined whether a voice command signal has been received. If so, the method proceeds to operation **556**. If not, the method returns to operation **552** to continue monitoring for a voice command signal.

At operation **556**, an audio signal is captured. The audio signal can be captured by the audio-capture device of the media-playback device. In some embodiments, an audio signal of a predetermined length is captured. Alternatively or additionally, an audio signal is captured until a property of the captured audio signal meets a particular condition. For example, audio capture may continue until the captured audio meets a condition indicating that no one is speaking (e.g., the volume of the audio signal within a particular frequency band corresponding to human speech is below a particular threshold for a particular time period).

Additionally, in some embodiments, an audio prompt is played at the beginning of operation **556** to guide the user regarding when to start speaking. The audio prompt may include a particular sound or a spoken phrase (e.g., “What can I do?” or “What would you like to listen to?”).

At operation **558**, the captured audio signal is processed to determine an action for the media-playback device to perform. The audio signal may be processed to identify keywords that correspond to commands. Additionally, the audio signal may be processed to identify an intent associated with the captured audio signal. In some embodiments, the captured audio signal is processed locally by the media-playback device, while in other embodiments the media-playback device transmits the captured audio signal to another computing device (e.g., the media-delivery system **104**) for processing. Combinations thereof are possible as well. In at least some embodiments, the action is a media-playback action that relates to the playback of media content items.

At operation **560**, an audio confirmation corresponding to the action is played back. For example, if the action is determined to be a request to playback media content items from a playlist named Discovery Weekly, the audio confirmation may convey that the playlist will begin playing (e.g., “Starting playlist Discover Weekly”).

At operation **562**, the determined action is performed. For example, the media-playback device will begin playback of the requested playlist.

FIG. 10 includes schematic diagrams of series of example user interface screens generated and shown in travel mode during a voice command interaction with a user by some embodiments of the media-playback device **102**. FIG. 10 includes the travel-mode user interface screen **442**, a user interface screen **590** for receiving voice input, and a user interface screen **600** for responding to voice input.

The travel-mode user interface screen **442** has been described above. The travel-mode user interface screen **442** may be shown while a media content item is being played in a travel mode. If a voice command signal is received while the travel-mode user interface screen **442** is being displayed (e.g., due to actuation of voice command control **470**), the user interface screen **590** will be displayed.

The user interface screen **590** includes a voice command mode indicator **592** and visual prompt **594**. In an example,

the voice command mode indicator **592** can be shown in green to indicate that the media-playback device **102** is now listening for a voice command. The illustrated visual prompt **594** includes text that says “What would you like to listen to?” Other embodiments can include different or additional text.

When the user interface screen **590** is shown, an audio prompt **596** is generated. The audio prompt **596** may include spoken text such “What would like to listen to?” as is shown in the figure. Other text or sounds can be included in other embodiments.

Once a voice command has been received from the user, the user interface screen **600** will be displayed. The user interface screen **600** includes the voice command mode indicator **592** and a visual prompt **602**.

The visual prompt **602** includes text indicating the determined action/command. In this case, the text says “Play Led Zeppelin”, which may correspond to what the media-playback device **102** understood a user as having said. Additionally, an audio prompt **604** is generated and played back by some embodiments when the command is determined. In this example, the audio prompt says “OK. Playing Led Zeppelin.” For example, the audio prompt may be generated using text-to-speech/voice synthesis technology or by playing back a stored recording.

As described above, the voice command mode indicator **592** indicates that the microphone is continuing to record sounds. In this example, the microphone may continue recording after determining the command for a predetermined time period. This additional recording may be processed to receive a correction from the user (e.g., the user may say “No. Play Lead Belly”). Some embodiments do not continue to capture audio after a command is received.

FIG. **11** is a schematic diagram of another embodiment of a user interface screen **640** generated by some embodiments of the media-playback device **102** when the media-playback device **102** is operating in a travel mode. The user interface screen **640** presents a plurality of cards on shelves that represent media content items that can be selected for playback. The cards are arranged along the shelves in a first direction **D1** (e.g., horizontal in this figure) and the shelves are arranged in a second direction **D2** (e.g., vertical in this figure) relative to each other. In some embodiments, the cards correspond to playlists of media content items and the shelves correspond to groups of playlists. In some embodiments, the cards correspond to individual media content items and the shelves correspond to playlists.

The media-playback device is configured to receive touch inputs to switch to a different card (e.g., playlist) or to select a card from a different shelf and, in doing so, change the focus of the user interface screen **640** to a different shelf. For example, a swipe touch input that is primarily directed in a horizontal direction will change to a different card in the current shelf and a swipe touch input that is primarily directed in a vertical direction will change to a different card in a different shelf. In some examples, changing to a different card or a different shelf can cause automatic playback of the changed-to card or a card from the changed-to shelf. In other examples, an additional user input is required to cause playback of the changed-to element.

In some embodiments, the primary direction of a received swipe touch input is determined by comparing the vertical change to the horizontal change between the initial contact point for the swipe touch input and the final contact point for the swipe touch input and selecting the direction with a greater magnitude of change. Alternatively, the primary direction of a received swipe touch may be based on

determining the primary direction (as described above) of a portion of the swipe touch input (e.g., a first portion of a predetermined duration, a middle portion of a predetermined duration, a final portion of a predetermined duration or by excluding an initial or final portion of a predetermined duration the swipe touch input).

Some embodiments are configured to recognize a swipe touch input received at any location on the user interface screen **640** as a command to select a different card and/or shelf as described above. Other embodiments are configured to recognize only those swipe touch inputs that begin within a particular portion of the user interface screen **640** (e.g., on or near the currently playing card or on or near the current shelf) as a command to select a different card and/or shelf as described above.

In this example, the user interface screen **640** includes a currently selected shelf **642**, an upper shelf **644**, lower shelf **646**. The currently selected shelf **642** displays graphical elements associated with a group of cards, including the graphical element **648** associated with a currently active card. The currently selected shelf **642** also displays a graphical element **650** and a graphical element **652** corresponding to other cards associated with the currently selected shelf **642**. The graphical elements **650** and **652** are cropped to display only a portion of the images associated with the cards in some embodiments. As described above, various portions can be retained after cropping such as about 5%, about 10%, about 20%, about 25%, about 50%, or any other portion. The graphical elements **650** and **652** allow the user to preview the other options available on the currently selected shelf **642**.

The user interface screen **640** also includes a textual descriptor **654** of the currently selected shelf **642**. In this case, the textual descriptor **654** includes the textual “Recently Played,” indicating that the cards in the currently selected shelf **642** are selected based on the user’s recent listening history. The user interface screen **640** also includes a textual descriptor **656** of the currently playing card. In this example, the textual descriptor **656** includes the text “My Favorite Coffeehouse.”

In this example, the upper shelf **644** includes a graphical element **658** corresponding to a card available on the upper shelf **644**. Similarly, the lower shelf **646** includes a graphical element **660** corresponding to a card available on the lower shelf **646**. In other embodiments, graphical elements for multiple cards available on the upper shelf **644** and the lower shelf **646** are included. The graphical element **658** and the graphical element **660** allow users to preview the cards available on the upper shelf **644** and the lower shelf **646** respectively. The graphical elements **658** and **660** can be cropped to display only portions of the image corresponding to the associated cards. For example, in this figure, the graphical elements **658** and **660** include images that are cropped horizontally to preserve a lower portion or upper portion of the corresponding images, respectively. Various portions of the graphical elements **658** and **660** can be retained after cropping such as about 5%, about 10%, about 20%, about 25%, about 50%, or any other portion.

The user interface screen **640** also includes various additional user interface elements. For example, the user interface screen **640** includes a textual description **662** of the currently playing media content item, a play-pause control **664**, a like control **666**, a voice command control **668**, and an additional options control **670**. The play-pause control **664** toggles playback of the currently playing media content item when actuated. The control **666** marks the currently playing media content item as a favorite (e.g., by setting a

field in a database, adding the media content item to a playlist, etc.). The voice command control **668** activates a voice command mode and may be similar to the previously described voice command control **470**. The additional options control **670** presents additional options when actuated. The additional options can, for example, relate to the currently playing media content item.

Additionally, in some embodiments a tap touch input is recognized as a skip forward command and a double tap touch input is recognized as skip backwards (or previous) command. The media-playback device **102** may be configured to recognize these skip forward/backward commands when the corresponding tap/double-tap inputs are received anywhere on the user interface screen **640**. In these embodiments, actuating the other user interface elements may, for example, require a long tap. Alternatively, the media-playback device **102** may be configured to recognize these skip forward/backward commands when the corresponding tap/double-tap inputs are received anywhere on the user interface screen **640** such as on or near the graphical element **648** or on or near the currently selected shelf **642**.

FIG. **12** is a schematic diagram of another embodiment of a user interface screen **710** generated by some embodiments of the media-playback device **102** when the media-playback device **102** is operating in a travel mode. Similar to the user interface screen **640**, the user interface screen **710** presents a plurality of cards on shelves that represent media content items that can be selected for playback. Also shown are touch targets **712** and **714**. The touch targets overlay the user interface screen **710** but are shown next to the user interface screen **710** for clarity. In other words, the touch targets **712** and **714** represent how the user interface screen **710** is divided into regions for interpreting touch inputs.

In this example, the media-playback device **102** is configured to recognize a tap touch input received in the touch targets **712** as a skip backward (previous) command, and a tap touch input received in the touch targets **714** as a skip forward command. In this example, the user interface screen **750** is divided vertically between the touch targets **712** and touch targets **714**. The touch targets **712** are disposed over a left-most portion of the screen and the touch targets **714** is disposed over the remainder of the screen. In this example, the touch targets **714** is larger than the touch targets **712** to allow users to more easily perform a skip forward action. In some embodiments, other divisions between the touch targets **712** and the touch targets **714** are used. For example, the division can be at 10%, 20%, 25%, 33%, 40%, 50%, or another percentage of the screen.

FIG. **13** is a schematic diagram of another embodiment of a user interface screen **750** generated by some embodiments of the media-playback device **102** when the media-playback device **102** is operating in a travel mode. The user interface screen **750** is similar to the media-playback engine **170** discussed above with respect to FIG. **12**. However, in this example, the user interface screen **750** is divided into a touch target **752**, a touch target **754**, a touch target **756**, and a touch target **758**. The touch targets **752** and **754** may operate similarly to the previously described touch targets **712** and **714**. However, the touch target **752** and **754** do not extend from the top to the bottom of the user interface screen **750**. Instead, the touch targets **756** and **758** are disposed as horizontal bands across the top and bottom of the user interface screen **750** respectively. Various embodiments are configured to provide various functionality when tap touch inputs are detected within the touch target **756** and the touch target **758** (e.g., switching shelves, actuate a different user

interface element such as those shown with respect to user interface screen **640** in FIG. **11**).

Similar to the user interface screen **640**, the user interface screen **710** presents a plurality of cards on shelves that represent media content items that can be selected for playback. Also shown are touch targets **712** and **714**. The touch targets overlay the user interface screen **710** but are shown next to the user interface screen **710** for clarity. In other words, the touch targets **712** and **714** represent how the user interface screen **710** is divided into regions for interpreting touch inputs.

FIG. **14** is a schematic diagram of another embodiment of a user interface screen **790** generated by some embodiments of the media-playback device **102** when the media-playback device **102** is operating in a travel mode. The user interface screen **790** is similar to the user interface screen **640** shown in FIG. **11** except that the user interface screen **790** also includes information pane **792**. In this example, the information pane **792** includes navigation information provided by a navigation application. Here, the navigation information comprises next turn information. In some embodiments, the media-playback device **102** is configured to switch to a different application in response to receiving a touch input within the information pane **792**. For example, the media-playback device **102** may switch to the navigation application providing the next turn information (e.g., as shown in FIG. **15**). Additionally, some embodiments include a user-actuatable interface element to expand the information pane **792** to provide additional information overlaid on the user interface screen **790**. The information shown in the information pane **792** is generated by a third-party application in some embodiments. Although the example shown in this figure relates to a navigation information and specifically next turn information. Other types of information can be shown too such as traffic information, weather information, communication information, etc.

FIG. **15** is a schematic diagram of another embodiment of a user interface screen **820** generated by some embodiments of the media-playback device **102** when the media-playback device **102** is operating in a travel mode. The user interface screen **820** allows for control of media content playback while providing content from another application. In this embodiment, the user interface screen **820** includes an application content panel **822** and a media content selection panel **824**.

In some embodiments, the media-playback engine **170** receives the content displayed in the application content panel **822** from another application running on the media-playback device **102**. Alternatively, the media-playback engine **170** transmits the content displayed within the media content selection panel **824** to another application running on the media-playback device **102** for display within the application. In this example, the application content panel **822** includes content related to navigating.

The media content selection panel **824** includes controls for selecting media content items for playback. In this example, the media content selection panel **824** includes a shelf that includes a currently playing card **826**, additional cards **830** that can be accessed and selected with a swipe left touch input, and additional cards **832** that can be accessed and selected with a swipe right touch input. In some embodiments, a tap touch input within the media content selection panel **824** is recognized as a skip forward command and a double-tap touch input is recognized as a skip backward (previous) command.

In some embodiments, base (or normal mode) user interfaces are provided using a declarative language. The base

23

user interfaces may be stored locally on the media-playback device **102** or may be provided by the media-delivery system **104**. Some embodiments perform a method of simplifying these base user interfaces to generate travel mode user interfaces for use during travel. In this manner, a single base user interface can be defined that can be programmatically converted to a travel mode user interface.

An example method for programmatically converting a base user interface can include the step of identifying and removing user interface elements that are smaller than a predetermined threshold. The method can also include removing less necessary controls, which may be identified based on a predefined set of control types, such as controls relating to curating (e.g., generating or editing) playlists may be in this set for removal in travel mode. The based user interface may also include tags that indicate whether the elements are necessary (e.g., an optional tag). The method can also include the step of generating touch targets for the remaining elements that are larger than in the base user interface. The method may also expand the rendering of the remaining element to match the expanded touch targets. Additionally, the method can include the step of generating a default action for touches that are outside of the defined touch targets (e.g., the default action may be skip for a single tap). The base user interface definition may also include information about an appropriate default action.

Here is an example declarative language definition of a portion of a base user interface:

```
<area name="background">
  <button name="button1" size="2">
  <button name="button2" size="5">
  <button name="button3" size="2">
</area>
```

Here is another example declarative language definition of a portion of a base user interface that include tags for use in rendering a travel mode user interface:

```
<area name="background">
  <button name="button1" size="2" importance="low">
  <button name="button2" size="5" importance="high" optional-
strike="background">
  <button name="button3" size="2" importance="low">
</area>
```

In some embodiments, when rendering this example user interface in normal mode, the importance and optional-strike tags are ignored, but when rendered in travel mode the tags are used. For example, the elements marked with low importance attributes are not rendered in the travel mode interface, the size of the remaining elements is increased (e.g., from 5 to 7), and an element is selected as the default button for background touches based on the optional-strike attribute.

As noted previously, although many of the examples provided above are described with respect to travelling in a vehicle, other embodiments relate to other forms of travel or even other types of activities in which a user should not be distracted.

The various embodiments described above are provided by way of illustration only and should not be construed to limit the claims attached hereto. Those skilled in the art will readily recognize various modifications and changes that may be made without following the example embodiments

24

and applications illustrated and described herein, and without departing from the true spirit and scope of the following claims.

What is claimed is:

1. A method comprising:

providing a user interface screen simultaneously including both:

a navigation application content panel showing navigation information; and

a media content selection panel showing:

a currently playing card representing a currently playing media content item and having a left side and a right side; and

additional cards representing media content items that can be selected for playback with a swipe touch input, wherein the additional cards include a first plurality of cards to the left side of the currently playing card and a second plurality of cards to the right side of the currently playing card; and

while providing the user interface screen, simultaneously including both the navigation application content panel and the media content selection panel, with the media content selection panel free of graphical representations of selectable playback controls on the media content selection panel and being overlaid on the navigation application content panel:

receiving, over the media content selection panel, a swipe touch input that selects one of the additional cards for playback;

playing a media content item associated with the selected card; and

while playing the media content item, providing navigation information in the navigation application content panel and displaying media playback information in the media content selection panel.

2. The method of claim **1**, wherein providing the navigation information in the navigation application content panel includes to provide next turn information or traffic information.

3. The method of claim **1**, further comprising:

receiving a tap touch input within the media content selection panel; and

recognizing the tap touch input as a skip forward command.

4. The method of claim **3**, further comprising:

receiving a double-tap touch input within the media content selection panel; and

recognizing the double-tap touch input as a skip backward command.

5. The method of claim **1**, further comprising:

converting a base user interface to a travel mode user interface for the media content selection panel.

6. The method of claim **5**, wherein converting the base user interface to the travel mode user interface includes:

identifying one or more user interface elements that are smaller than a predetermined threshold; and

removing the one or more user interface elements.

7. The method of claim **5**, wherein converting the base user interface to the travel mode user interface includes:

generating touch targets for user interface elements on the travel mode user interface that are larger than touch targets of the user interface elements in the base user interface.

8. The method of claim **1**, wherein the method is performed by a media-playback device separate from a vehicle head unit.

25

9. A media playback device comprising:
 an audio output device for media playback;
 a touch-sensitive display;
 one or more processors; and
 a computer-readable storage device storing instructions, 5
 which when executed by the one or more processors,
 cause the one or more processors to:
 provide a user interface screen at the touch-sensitive
 display, the user interface screen simultaneously
 including both: 10
 a navigation application content panel showing navigation
 information; and
 a media content selection panel showing:
 a currently playing card representing a currently
 playing media content item and having a left 15
 side and a right side; and
 additional cards representing media content items
 that can be selected for playback with a swipe
 touch input, wherein the additional cards
 include a first plurality of cards to the left side 20
 of the currently playing card and a second
 plurality of cards to the right side of the currently
 playing card;
 while providing the user interface screen simultane- 25
 ously including both the navigation application content
 panel and the media content selection panel,
 with the media selection panel free of graphical
 representations of selectable playback controls on
 the media content selection panel and being overlaid
 on the navigation application content panel: 30
 receive, over the media content selection panel, a
 swipe touch input that selects one of the additional
 cards for playback;
 play a media content item associated with the
 selected card using the audio output device; and 35
 while playing the media content item, provide navigation
 information in the navigation application
 content panel.

10. The media playback device of claim 9, wherein to 40
 provide the navigation information in the navigation application
 content panel includes to provide next turn information
 or traffic information.

11. The media playback device of claim 9, wherein the 45
 instructions further cause the one or more processors to:
 receive a tap touch input within the media content selection
 panel; and
 recognize the tap touch input as a skip forward command.

12. The media playback device of claim 11, wherein the 50
 instructions further cause the one or more processors to:
 receive a double-tap touch input within the media content
 selection panel; and
 recognize the double-tap touch input as a skip backward
 command.

13. The media playback device of claim 9, wherein the 55
 instructions further cause the one or more processors to:
 convert a base user interface to a travel mode user
 interface for the media content selection panel.

14. A computer-readable storage medium storing instruc- 60
 tions that when executed by a processor, cause the processor
 to:
 provide a user interface screen simultaneously including
 both:
 a navigation application content panel showing navigation
 information; and
 a media content selection panel showing:

26

a currently playing card representing a currently
 playing media content item and having a left side
 and a right side;
 additional cards representing media content items
 that can be selected for playback with a swipe
 touch input, wherein the additional cards include
 a first plurality of cards to the left side of the
 currently playing card and a second plurality of
 cards to the right side of the currently playing
 card; and
 while providing the user interface screen, simultaneously
 include both the navigation application content panel
 and the media content selection panel, with the media
 content selection panel free of graphical representa-
 tions of selectable playback controls on the media
 content selection panel and being overlaid on the
 navigation application content panel:
 receive, over the media content selection panel, a swipe
 touch input that selects one of the additional cards for
 playback;
 play a media content item associated with the selected
 card; and
 while playing the media content item, provide navigation
 information in the navigation application content panel
 and displaying media playback information in the
 media content selection panel.

15. The computer-readable medium of claim 14, wherein
 to provide the navigation information in the navigation
 application content panel includes to provide next turn
 information or traffic information.

16. The computer-readable medium of claim 14, wherein
 the instructions when executed by the processor further
 cause the processor to:
 receive a tap touch input within the media content selection
 panel; and
 recognize the tap touch input as a skip forward command.

17. The computer-readable medium of claim 14, wherein
 the instructions when executed by the processor further
 cause the processor to:
 receive a double-tap touch input within the media content
 selection panel; and
 recognize the double-tap touch input as a skip backward
 command.

18. The computer-readable medium of claim 14, wherein
 the instructions when executed by the processor further
 cause the processor to:
 convert a base user interface to a travel mode user
 interface for the media content selection panel.

19. The computer-readable medium of claim 18, wherein
 converting the base user interface to the travel mode user
 interface includes:
 identify one or more user interface elements that are
 smaller than a predetermined threshold; and
 remove the one or more user interface elements.

20. The computer-readable medium of claim 18, wherein
 converting the base user interface to the travel mode user
 interface includes:
 generate touch targets for user interface elements on the
 travel mode user interface that are larger than touch
 targets of the user interface elements in the base user
 interface.

* * * * *